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ART. I. *Contributions to Cardiac Pathology.* By THOMAS H. WRIGHT, M. D. Physician to the Baltimore Alms-house Infirmary.

CASE I. *Aortal aneurism.*—J. Coursey, a robust black man, about fifty years of age, became an inmate of the Baltimore Alms-house in the winter of 1829. On what account this man had been originally admitted could be no further ascertained than that he was the subject of old inguinal hernia, which together with other chronic infirmities had rendered him unable to labour for his support; he had also been long affected by some embarrassment in his breathing, with hoarseness and wheezing, of the kind popularly termed "the phthisic." In other respects he appeared tolerably well, was full in flesh, and sufficiently active to be engaged in light work about the institution, and had not at any time after admission, required the indulgence of stay in hospital.

In April, 1829, Coursey made application for something to rub on a knot, (as he called it,) on his breast, which he said was painful at times. Examination of the part betrayed the nature of the swelling referred to, which proved to be aneurismal development, representing a tumour about the size of an egg, situated near the inferior margin of the left clavicle. The tumour was oval in shape, elastic or compressible, and pulsating boldly wherever touched. The swelling was about equidistant from the sternal and humeral end of the clavicle, and rose so near the inferior edge of that bone, as to be taken at first for aneurism of the left subclavian artery, a conjecture which subsequent more careful inspection showed to be incorrect, and the

true seat of the affection was determined to be the highest point of the aorta itself. The anterior part of the arch of this great vessel was conceived to have undergone a sacciform dilatation to such extent as to have pushed the pleural lining of the thorax and the intercostal muscles before it, until it emerged between the second and third ribs, so as to stand a defined enlargement or tumour, raised considerably above the plane of the thorax. The circulation was found to be free in the upper extremity of both sides, the pulse full and distinct in each arm, though perceptibly stronger in the right than in the left.

In circumstances like these, surgery was out of the question, and the other resources of art promised but little toward arresting the progress of local mischief. It was necessary however to employ all the probable means of delaying the lesion which could not be finally prevented. The man was withdrawn from labour of every kind, placed at rest, (for the most part in a recumbent posture,) and cautioned against all considerable voluntary exertion, or strong excitements of mind; and his diet was reduced in kind and amount as far as regard for due constitutional support would allow. General bleeding was directed to be employed, and repeated as often as could be well borne—the quantity abstracted never to be so great at one bleeding as to be very sensibly acknowledged by its disabling effects. Cold topically applied and frequently renewed for a considerable time every day, was also ordered as auxiliary to the general plan and object of treatment—the manner of application, by cloths or sponge, saturated with cold alum water.

The man's state continued very much the same for two months that he remained in hospital, at the end of which time he grew discontented with confinement and restricted diet, and obtained permission of the governors of the institution to leave the house. He had at this time only occasional pain in the tumour, never very severe, no fever, and did not feel as a sick man, but was troubled by frequent dry cough, and wheezy respiration, the consequences apparently of tracheal irritation and embarrassment by pressure. When he left the house, the swelling on the breast was not manifestly less, or larger, than when he was taken into hospital.

Coursey had been absent from the house, and his case almost forgotten, when at the end of nine months, he presented himself again, with the old symptoms of cough, dyspnœa, hoarseness, &c. all greatly aggravated. He was now too a good deal reduced in flesh and strength, and in all respects evidently fallen off in his general health. He breathed with much more manifest labour or effort than formerly; the sound of inspiration, the wheezing before mentioned, was now so

audible as to betray very considerable straightening of the tracheal passages, and his articulation was at this time scarcely more than a whisper. The recumbent posture had become inconvenient, sometimes could not be borne, and much annoyance was experienced from collections of viscid phlegm, obstructing the upper portion of the wind-pipe.

Some curious and interesting changes were found to have taken place in the local characters of this man's case during his absence from the house. There was no longer any appearance of that definite tumour or enlargement on the surface of the thorax, formerly so distinct, and then exhibiting an almost regularly circumscribed swelling, as first described. The part where this prominent enlargement had been, was now level with the common surface of the thorax, and pulsation could not be perceived there at present, more than in other parts of the same region. In place of a particular swelling with definite limits, the whole superior portion of the left thorax was now unnaturally prominent. The upper third of the sternum was the most protruded part, standing forward or outward, very obviously more than any other portion of that bone, and was gently rounded, or convex in front, as if pressed forward by some force acting mainly against the inner central surface of the protruded part. The cartilages also of the left side, and the corresponding portions of all the upper ribs were bent or bowed outwards, so as to make the left thorax considerably higher than the right. Pulsation was now a strong, even visible shock, diffused or imparted alike over the whole of the prominent region.

Another peculiarity noticed on the reädmission of the patient was, the total extinction of the pulse at the left wrist. When the aneurism was first discovered, and at the time the man left the institution, nine months before, circulation was nearly of natural force in the arm of the affected side; now none could be distinguished. The arm was somehow nourished, but the pulsatory action was not palpable in any part of the limb. The first change, that in respect to the particular locality, form, and extent of the swelling, seemed to import that the aneurismal development at the top of the arch had ceased to progress in its original direction, and was no longer so special or definite as at first, but had become more diffused, extending perhaps laterally downwards and forward, rather than upward. The second alteration, that with regard to the loss of pulse in the left arm, implied that the passage by the left subclavian, formerly open, was now closed, either sealed up by obliteration of the canal of the artery at its aortal mouth or end, or else obstructed by coagulum, or lymph

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deposit, in that part of the aneurismal sac, completely preventing the entrance of blood into this vessel. By one or the other of these impediments to the transit of blood by the subclavian, the arm seemed to have been thrown into a state of dependence upon the cervical and humeral anastomotics; a communication sufficient as it appeared for nutrition, but not free enough for evident pulsation.

To ascertain the state of the circulation by the main channels of transmission, a particular examination was now directed to the manner in which the function of the large vessels respectively was performed. The innominatum, right carotid, and subclavian, gave free and regular pulsation in unison with the heart's stroke, the impulse by those vessels rather less forcible than in a healthy subject. The left subclavian, on the axillary end of the second rib, no perceptible movement; left carotid, pulsatory action indistinct; some impulse was felt, but so faint as to leave it doubtful whether derived from movement of fluid through the vessel, or the effect of a general shock or jar among the neighbouring parts by the heart's stroke, and not imparted directly by action of the artery itself. The abdomen of the patient was flat and soft, muscles attenuated, and parts altogether favourable for taxis. Aorta of this region pulsating feebly, action discriminated with difficulty, and readily suppressed; pulsation rather more sensible, though still very weak in external iliacs as they emerge on the thigh. The veins on the surface of the left thorax were all enlarged and tortuous. A superficial vein of the abdomen presented a singular appearance. It rose, large as the little finger, from the left groin, and ascended in a curvilinear manner, bending quick to right and left in its whole track, until it connected itself by a free and obvious junction with the long thoracic or external mammary vein, which takes its course toward the axilla along the lower margin of the great pectoral. The large serpentine vein, just described, lay in its whole course over the usual route of the epigastric artery and vein within, and was taken for the left superficial, (external,) epigastric, or more properly, hypogastric vein; it was much longer, and varied very much in its course from any of the superficial inguinal veins.

These changes which the progress of the case had induced were remarkable and interesting, and were calculated to provoke curiosity as to their cause and manner of accomplishment. They appeared to imply that direct conveyance by the left subclavian artery was intercepted, perhaps by one of the modes of obstruction above suggested, and also that the left carotid had ceased, either wholly or in great part, to carry blood to the head. The great channel downwards too,

the descending aorta, was so imperfectly supplied with fluid, or its pulsatory power so much weakened, that the movement by it, or through it, was scarcely palpable. It seemed from all the circumstances, as if the left upper, and the lower extremities had accommodated themselves to a much less than natural quantum of blood, or else that some secondary channels of supply had become the substitute, or auxiliaries of the primary and proper routes. The latter supposition was rendered probable by the state of the superficial veins of the thorax and abdomen, the very great enlargement of which seemed to import, that extraordinary capacity of transmission on their part, was required to meet a correspondent change of state and office in the set of arteries with which they were in communication. The fine inosculations, (familiar to anatomists,) between the extremities of the epigastric and internal mammary arteries, were ostensibly indicated by the circumstances of the case, as here contributing efficiently, by a vicarious function of conveyance, to the nutrition of the lower parts of the body.

This man remained in hospital altogether subsequent to his recent admission, but was subjected to no other treatment than light regimen and palliatives of cough, which had become more frequent, and caused greater inconvenience than formerly. He kept for the most part on the bed, but was often unable to lie down fully, in consequence of paroxysms of difficult breathing, and teazing cough, by which he was occasionally much annoyed in the recumbent posture. When he could lie down entirely, the right side was the easiest posture; he could not bear to lie at all on the left side.

From the many examinations he had undergone, and remarks on his case in his hearing, the patient was aware of the fact that the pulse of his left arm had been lost; this appears to have excited his attention, and led him to the practice of frequently feeling the wrist of that side. Owing to this habit, he was himself the first to discover and to announce that pulsation had returned in the left arm. This discovery was made by him about the end of the third month from the date of his last admission into the house. The pulse had become perceptible at the wrist, but the stroke was very faint; it increased gradually in force, so that by the expiration of the fifth month in hospital, it was quite distinct and regular, though still small. It did not afterwards augment in any sensible degree, and never became more than half the strength or volume of the natural pulse, or of that of the other side.

Here was another change in the condition of the case fitted to exercise conjecture as to its occasion and means. Did the return of

pulsation in the left arm imply that some cause of obstruction at the mouth of the subclavian had been removed, and the canal thus again opened; or had some of the indirect channels of supply been gradually enlarged and perfected until the quantum of blood and facility of transmission were sufficient to impart the pulsatory movement through the limb below. It was now also discovered that pressure on the left subclavian, where it crosses the rib, would stop the pulse at the wrist, and this fact led an intelligent surgeon who saw the case, to infer that the aortal end of the subclavian was open, and had perhaps never been shut, or not more than temporarily obstructed. Although the circumstances just noted appeared to favour the conclusion drawn from them, my own impression remained, that direct communication did not exist between the aorta and subclavian, and that blood being poured by the cervical anastomotics of the opposite sides into the canal of the subclavian above the axilla, pressure in that portion of its tract might extinguish the pulse below. All these conjectures however were for the present uncertain, and insufficient to demonstrate what had actually happened; the proof of such question must abide the issue of time and events. The pulsatory action of the left carotid had not returned, as in the case of the arm of the same side; it was always doubtful, after defect of action was first discovered there, whether the great artery of the neck on the left was at all engaged in the office of circulation.

On the 23d of December, 1831, the unfortunate subject of this terrible affection died suddenly in the night, without any previous symptom or acknowledgment of more than usual indisposition. He had even appeared, and expressed himself for some time before his death, less distressed by his disease than formerly.

Examination on the day after death.—By detaching the sternum with its cartilages from the ribs, and from its other connexions, so as to be able to raise up that bone from below, the pericardium presented itself immensely dilated, and completely filled with some kind of fluid. At the upper end of this bag a large tumour appeared, which was easily recognised as the aneurismal portion of the aorta, stuffed with coagulated blood or lymph, so as to give that part more of form and solidity than the rest of the pericardial bag and its contents. At its highest anterior part, this tumour adhered firmly to the sternal end of the first rib on the left side, from which attachment it was cautiously freed by the knife, and the whole sternum removed. The aneurismal tumour now showed plainly, occupying the whole arch of the aorta, which was greatly enlarged and filled in its upper part by a dense mass of lymph concretion, adhering closely to the

inner surface of the sac, and giving much firmness to all the convex portion, or arch of the dilated aorta. There was no opening into this large tumour, or the bag which enveloped it, except where the latter had been unavoidably penetrated in cutting it loose from its adhesion to the inner surface of the first rib; neither was there any blood effused into the cavity of the thorax—none in the mediastinal or pulmopleural space. The left thoracic cavity contained much water, and the lung of that side was extremely thin, flaccid and collapsed, showing the effect of continued pressure by the aneurismal tumour; this lung had evidently been long out of use, and was greatly shrunk or atrophied, but not at all diseased, or degenerated in texture.

Before tracing the connexions of the aneurismal tumour within the thorax, and while it still remained in place, preserving all its relations during life, attention was turned to the state of the principal vessels issuing from the main trunk—the aorta. The left subclavian was the first vessel whose connexion with the sac was investigated. It was found larger than common in its course along the clavicle, and perfectly free in its canal, from the axilla toward the heart; a probe passed up within it without hindrance of any sort, as far as the point at which it should have communicated with the main trunk; here the probe stopped abruptly, and could not be passed further, or made to enter the aorta or cavity of the aneurismal sac. The check was sudden and total, showing the mouth of the subclavian to be completely closed or obliterated.

The left carotid was next examined, and through a small incision into it, just above where it is crossed by the clavicle, a probe was passed upwards, and moved freely as high as the head, encountering no impediment until stopped by the winding form of the carotid canal. Downward the probe followed the channel of the carotid to where its original communication with the aorta had been, but which now no longer existed, the probe stopping in a cul-de-sac on the antero-posterior side of the aorta, about six inches below the line of the clavicle. This unnatural extent of the tract of the carotid within the thorax, was caused by the elongated state of the dilated portion of the aorta. Thus the left carotid, as well as the subclavian of the same side had entirely lost communication with the great trunk into which they naturally opened.

While dissecting the neck for the better investigation of the arteries coming off from the aorta, the veins of that region attracted attention on account of their unusual size and fulness. The left external jugular or superficial cervical vein was uncommonly large,

as were also the thyroids, and numerous other branches communicating with it. But none of this superficial set of veins contained much blood, they were flat and nearly empty. The state of the internal jugular of the same side was very different in this respect, it was large, round and full, even distended with black blood, in a semiconcrete condition. In tracing this vessel, it was found to lessen in size as it approached the clavicle, and just above that bone it contracted abruptly, so as to shut up its canal, and instead of communicating with the subclavian vein, was here converted into an impervious cord or ligament. The left axillary vein was open, full size; and the subclavian also, (the coats of the latter much thickened,) was pervious and free, as far as the point of natural junction, with the deep jugular; at which place, the canal of the subclavian was obliterated, and its continuation from this point, once forming the great trunk, the transverse, which connects the veins of the left with those of the right side, to form the cava descendens, was now a mere ligament.

The nervus vagus, (8th,) of the left side, which was exposed in tracing the carotid and deep jugular down the neck, was uncommonly large, being in its whole course to the pericardium nearly the size of a crow-quill, and was changed in colour from its natural white, to a strong reddish tinge; it was intimately blended with, and lost, in the altered structure of the upper part of the aneurismal sac, originally part of the pericardium.

From the absence of distinct pulsation by the abdominal aorta, during the life of the patient, it had been conjectured that this great trunk was very much contracted, or in some way obstructed at, or near the lower part of its aneurismal portion. Contrary to this surmise, both the thoracic and abdominal tract of the aorta was found perfectly free and full-sized; its thoracic portion even larger than natural, and communicating directly, by a large, open canal, with the free space of the aneurismal sac. On this side, the left, the aneurismal tumour had not formed any very close or firm adhesions to the parts on which it lay; none to the spine, or left side of the vertebræ; but on the right, the back part of the aneurismal cyst, was intimately attached to the bodies of the third and fourth dorsal vertebræ, and in destroying this adhesion, the sac was unavoidably opened at those points. The whole tumour was now removed by bringing down the trachea and œsophagus; dividing the arteries of the neck and arm, and cutting the aorta near to the diaphragm. The trachea and œsophagus were both involved with the posterior coats of the tumour; the œsophagus so intimately adherent near the branching of the trachea,

as to be inseparable without opening into either the sac, or the tube, the partition between them was a mere film, scarcely more dense than the finest paper.* It has been before noticed, that no blood had been effused into the thorax; and also, that the pericardial sac was greatly enlarged. The increased extent and capaciousness of this bag, was owing partly to the aneurismal development, in which its upper portion was included; and partly to large serous dropsy of the bag itself, by which accumulation it was greatly distended, laterally and downwards. The dilated and diseased aorta had given way at its inferior portion near where it rises from the ventricle, and thus poured the whole of its contents into the dropsical pericardium, the lower half of which was loaded with a large mass of coagulated blood. Hence the cause of sudden death without external hæmorrhage; and the reason also why no blood was effused into the free space of the chest. The heart was very diminutive in size, and pale, or blanched, but not obviously diseased.

Remarks.—It was a curious, and as far as I know an unusual circumstance, which occurred early in this case; namely, that the primary aneurismal development which had advanced to such a degree, as to press between the second and third ribs, carrying muscles and integument before it, and presented itself as a well-defined pulsating tumour, above the level of the chest, should have ceased to advance in this direction, and retired completely within the thorax, leaving no external trace of its existence.

Another interesting event in the course of the disease, was the fact, that before the man left the house, as mentioned in the account of the case, and while the external tumour existed at the top of the chest, the pulse was free in the arm of the affected side, and on the contrary, at the time of his return, or second admission into hospital, when no special swelling could be any longer recognised, pulsation was wholly extinct in the left arm. The same defect of sensible pulsatory movement, was now also discovered in the left carotid, and in the great trunk of the belly; in the former of which no regular stroke or pulse could be distinguished, and in the latter, only an obscure and feeble action, scarcely to be defined as pulsation.

The conclusions drawn, during the life of the patient, from the changes just recited, were afterwards found to be partly right, and in

* This explains an event which occasionally happens in aortal aneurisms about the arch; viz. their liability to break into the œsophagus, and be discharged by vomiting; or to break into the œsophagus and trachea at the same time, in some unusual effort, or fit of violent cough.

part erroneous. It was proved by dissection, that the aortal mouth of the left subclavian and carotid were completely sealed up;* as had been conjectured; and that no blood passed directly from the heart into those vessels. But it was also found, contrary to expectation, that the descending aorta, instead of being contracted, closed, or obstructed, in some part of its thoracic or abdominal tract, was throughout fairly pervious, and even rather larger than natural. The supposed vicarious function which had been attributed to the internal mammaries and epigastrics, was also refuted by examination. The probability of an important change in the state and offices of this set of arteries had been based on the nature and seat of lesion in the great trunk; the obscureness amounting almost to total absence of pulsation in the abdominal aorta, and on the great enlargement, together with the obvious anastomoses of the superficial abdominal and thoracic veins. All these inferences however were overturned by the capacious and unobstructed state of the descending aorta, and equally contradicted by finding the internal mammaries and epigastrics in their normal state, in no degree enlarged, and not perceptibly more in communication than is natural and common.

Two questions present themselves for consideration in a physiological summary of the facts in this case. First, how was the left side of the head, neck, and left upper extremity supplied with blood. Secondly, in what manner was the venous circulation of the same parts accomplished. The first question occurs because the channels of supply by the left carotid and subclavian were stopped by permanent closure of the mouth of these vessels; while the second is founded on the fact that the left internal jugular was obliterated before it reached the subclavian vein, and the latter, the subclavian vein itself, from the point where the jugular should have communicated with it, was converted into a mere ligament; thus intercepting all communication by this route with the descending cava.

The supply of blood to the left side of the neck, head, and left arm, must have been effected through inosculating branches of the right and left carotids, and subclavians; the latter principally; namely, the inferior thyroids, cervicales, and transversæ colli and humeri, reïnforced in part perhaps through the descending or superior thyroids.

* By slitting open and partly inverting the aneurismal sac, so as to expose the points at which the probe stopped in the bottom of the subclavian and carotid canals respectively, no trace remained of the former openings of those vessels into the main trunk. These were utterly effaced, by a membranous covering as smooth, thick, and firm, as the coats of the artery elsewhere, and in all respects like the rest of the inner wall of the dilated aorta.

The trunk of the superior thoracic of the left side was uncommonly large, and the branches of the humerarius, rising from it, numerous, and of greater size than usual. By this route chiefly, the blood of the left upper extremity appears to have entered the axillary artery, in quantity sufficient to nourish the limb; and ultimately, (by increasing freeness of inosculations,) to impart a distinct, though feeble pulse of circulation;* the subclavian artery also, was thus kept open toward the aorta, preventing the contraction which usually takes place in arteries from which the blood is entirely diverted.

The course of the return, or venous circulation of the left side, was, in some respects much more dubious and obscure, than that of its arterial supply. It is divisible into two routes, one of them departing greatly from the natural tract. The venous blood of the left side of the neck and head, may have found its way readily enough to the right side of the heart, by the free communication of the external jugulars with each other, and of the left external, with the left internal jugular; thus drawing off all the blood of that trunk, above the point of its sudden contraction and closure. This appears to have been the course taken, the external jugulars of both sides were manifestly larger than natural, particularly across the lower front of the neck, and were always turgid during the life of the patient.

But the return circulation of the left arm, was by no means so convenient or discernible, as the channels found for the venous blood of the left side of the neck and head. By the total obliteration of the left subclavian vein, from where the deep jugular joins it, all access to the heart would seem to be denied to the venous blood of the left arm. Even this difficulty however, appears not to have been too great for the admirable provisions of structure, and surprising vital endowments of the organic constitution. In looking for some route by which the venous blood of the left arm may have found its way to the right side of the heart, its natural course by the subclavian being shut up, I can perceive but one channel by which it could be brought into the current leading to its proper receptacle—the right auricle. It has been before mentioned, that a superficial vein of the belly, enlarged to the size of a finger, ascended in a tortuous manner, up the left side of the abdomen, until it communicated manifestly and freely with the external mammary, or long thoracic vein of the same side.

This then seems to have been the return route of all the venous

* The communication across the neck being principally with the left axillary artery in front, explains why pressure about that point, stopped the pulse at the wrist.

blood of the left arm. After having been collected, by the axillary vein, it passed by the long thoracic down this great abdominal or superficial hypogastric vein, and was dropped into the femoral vein just below Poupart's ligament; from whence it mingled with the current of the iliacs, and found its way by the ascending cava, to the right auricle.

If this be a true explanation of the manner in which the difficulties of the venous circulation of the left arm were surmounted, the case adds another curious example to the many already on record, of the wise and ample resources of the animal constitution, against great exigencies, arising out of accident and disease. During the life of the patient, it had been noted, that when lying nearly recumbent, the veins of the abdomen, (the great vein described, and two lesser veins running parallel with it, also enlarged,) were rather flaccid, but on rising up to the sitting posture, they all became dilated and tense. In the standing posture again, these veins were less full and prominent than in sitting, owing apparently to some degree of compression by the latter posture in the groin, or about the place of communication with the femoral vein. The presumption that the venous blood of the left arm returned to the heart by the circuitous route pointed out, is greatly strengthened by the fact, that the superficial abdominal veins were enlarged *on the left side only*, those of the right remaining small as usual.

The almost total absence of pulsation by the abdominal aorta in this case, might be very differently interpreted by the advocates of opposite theories respecting the natural powers of the circulation, or the forces by which the blood's movement is originated and maintained throughout its circuit. The aorta was free and unobstructed through its whole course in the thorax and belly, and also communicated by a direct opening, large as the calibre of the rest of the trunk, with the cavity of the aneurismal portion of the vessel, so as to receive readily the rush of blood as it was delivered at each contraction of the ventricle. Why then was so little pulsatory action perceived in the artery below? To those who imagine that the contractile power of the heart is the only force by which motion is imparted to the blood, it might seem that the defect of pulsation in the aorta furnished evidence in favour of their hypothesis. The momentum of the heart's action, it might be said, was too much expended upon the aneurismal portion of the artery; and the mass of solid matter, (concrete lymph,) it contained, to be distinctly or forcibly imparted by the fluid entering the tube leading out of the great sinus or sacculated part of the aorta. The vis a tergo, in other words, would thus be

so broken or lessened, as to be only faintly perceived in the abdominal track of the main channel of supply to the trunk of the body and lower extremities.

It might be contended, on the other hand, by the advocates of the doctrine of inherent organic properties of action in the arteries themselves, by which they carry on the blood delivered to them by the heart, and to the exercise of which powers pulsatory action is mainly owing, that the facts in the case afford equal support to their construction of the natural phenomena of circulation. On the latter theory of the moving powers of the blood, the feebleness of pulsation in the aorta below the aneurismal portion, would be referred to the morbid state and changes in the vessel, and consequent impairment of its tonic and contractile energies; and hence the feeble display of propulsive or pulsatory action. The testimony is both ways, and would be interpreted according to the favourite doctrine, with which it was compared. One fact would appear to have some bearing on the point in question; there was no very evident deficiency of pulsatory action in the principal trunks leading from the aneurismal sinus to the right upper regions of the body; the vessels supplied through the innominatum the right carotid and subclavian. The pulsation of those vessels, though not positively strong, was perfectly distinct, and very near the common standard of force. It must be considered, however, that this set of vessels received the jet of blood from the heart in a more immediate manner, and at much less distance from the ventricle, than the mouth of the thoracic aorta placed by the enlarged state of the arch, low down in the chest, almost under the heart, and receiving only the deflected current of blood: the innominatum, on the contrary, looked directly toward the left ventricle, and was only somewhat more distant than common from that chamber, in consequence of elongation and distention of the root of the aorta.* With due allowance for this relative position of the upper and lower canals with reference to the central power, or momentum of the heart, my own opinion of the moving forces of the circulation would incline me to attribute the defect of pulsatory action in the aorta, mainly to impairment of propulsive contractility in the vessel itself, consequent on the diseased state of its coats at, and for some distance below its arch.

Carditis and pericarditis—lymphatic or membranaceous.—The

* The innominatum was also exempt from any manifest degeneracy of its own tunics; a condition very different from the highly morbid state of the aortic structure.

high degree of sensibility attributed to the textures of the heart, and the immense importance of the function performed by that organ, seem calculated to render it peculiarly incapable of enduring irritation, or undergoing morbid changes, without betraying manifest and formidable signs of the disturbance it suffers, or the lesion to which it has been subjected.

But whatever may have once been thought of the liability to instant and urgent danger from diseased actions accruing to the heart's substance, it is now very well known that morbid states of this part are by no means rare, and also that imminent or immediate danger is not the invariable attendant on cardiac affections. It is also sufficiently ascertained that diseased conditions of the heart may arise, continue long, and effect great changes in the texture, connexions, &c. of that organ, without any certain or violent display of suffering or danger. The affections of the heart and its appendages, denoted by the terms prefixed to these remarks, have often been found, (by after search,) to have constituted the occasion of many symptoms, which, during life, were either deemed of little importance, or too equivocal and obscure to allow of their being referred to so serious a cause as disease of the heart itself. Carditis and pericarditis, singly or together, have progressed in a silent and undistinguished manner, to the extent of almost total alteration of the natural condition and relations of these textures to each other, and to other parts, and there has been nothing to mark the change that was going on, or to reveal the special seat and nature of such disease or degeneration.

If any proof was wanted to show the fallacy of former opinion respecting the incapacity of the heart to bear direct irritation without obvious derangement of its common office, and great, or even fatal disturbance of its extensive and important physiological associations, such requirement is amply supplied by autopsic evidences. The strong vestiges frequently met with on the dissecting table, of ancient inflammation and its consequences, about the heart and its appendages, furnish unequivocal testimony on this head, and go to show plainly, that the heart, like many other fibrous structures, may endure the gradations of acute and chronic inflammation, not only with safety to life, but in a manner little obvious, and not easily discriminated. The records of surgery, of military surgery especially, supply full confirmation of the same fact, in the numerous instances reported, where the heart has been found to have suffered former violence, (to the extent of actual lesion,) of which the traces and the proof were still palpably betrayed. That the attributes of intrinsic sensitiveness, proper to this important organ, have also been greatly overrated, may

in like manner be inferred, on the testimony of the facts and circumstances already noticed, which appear calculated to discountenance the presumption of any peculiar or exquisite organic sensibility in parts capable of undergoing irritation and its consequences to the extent pointed out, without those attendant symptoms—pain, disordered action, &c. which might clearly indicate the place, degree, or duration of morbid influence, suffering, and change. Even direct evidence to the same effect would seem to be furnished by some experiments, performed in a spirit at least sufficiently adventurous, and affording results highly curious, though of small apparent utility. While acupuncturation was in fashion for the cure of rheumatism, the needle, (we are told,) has been passed toward the heart, for supposed rheumatic neuralgia of that seat, until its succession of action and repose was plainly represented by the alternate rise and fall of the instrument, and yet no expression of particular pain or distress was extorted by this, (as it would seem,) actual penetration of the substance of the organ.

Case II. *Carditis and pericarditis.*—F. Antony, a female, aged about fifty, was admitted into the Baltimore Alms-house in October, 1831, affected as had been supposed, by pneumonic catarrh, now in a somewhat chronic stage. She had cough of some weeks duration; without pain of the breast, and only slight impediment of respiration. A considerable degree of mucous rattle was discoverable in her breathing; expectoration trifling, of common pituitous matter. There was no fever; pulse soft, rather small, indicating great debility. Personal appearance in this case was indicative of naturally robust constitution; the woman was above middle size, still muscular, and reported herself to have enjoyed general good health, without any former serious illness, and had for many years past, performed laborious services, chiefly as a cook; present indisposition altogether of three weeks duration.

The information obtained of the patient respecting the early circumstances or symptoms of her present illness, was partial and uncertain, fitted rather to obscure than explain the cause or condition of her sickness at this moment; she was either unable or unwilling to give any consistent or intelligible account of her recent state; appeared to think her illness slight, and was impatient of inquiries on the subject. The signs of danger were now manifest; evidences of serious impairment of vital power were revealed, both in the respiration and the pulse; the first was imperfectly performed, and attended by symptoms of pulmonary infiltration to an extent which must greatly embarrass the office of the lungs; the latter was deficient of tone, in a degree betraying unsafe diminution of that nervous influence by which

the heart's action is sustained. Brain embarrassment was the interpretation to which the symptoms appeared to point. Diagnosis—congestion, vascular engorgement of the membranes, more especially about the tuber annulare and medulla oblongata; cerebral serosity in excess, and increasing. Prognosis—death in a few days, by effusion.

The patient prostrated more rapidly than was anticipated, and died on the night of the second day after admission. There was no convulsion, nor any violent tumult before death; neither did coma or insensibility supervene, the patient continuing conscious and intelligent as long as she lived. The difficulty of respiration augmented gradually after admission, unattended by cough, but with constant increase of the pulmonary ronchus before noted, showing progressive decay of that particular innervation on which the lungs mainly depend for their vital endowment.

Examination.—The contents of the thorax free from any signs of recent inflammation; lungs natural, neither reddened nor hardened in any appreciable degree; serous membranes pale, and looking natural; partial adhesions and thickening in places, showing traces of former phlogosis; some pleuro-pulmonary serosity, apparently old. In the head was found large excess of surface fluid, quantity greatest toward the base, (cerebro-spinal dropsy;) membranes of the brain very much tinged by patchy redness; colour highest over posterior lobes. The vascular plexus about the pons was highly engorged; arachnoid of cerebellum and medulla oblongata pink-red; aqueous accumulation large around the pons, crura cerebri and cerebelli. The ventricles exhibited only small serosity; substance of the brain apparently natural.

The heart of this subject was taken out for examination, in consequence of apparent uncommon density of its envelope. The pericardium proved on incision to be one-eighth of an inch in thickness, and so hardened in texture as to cut like wet leather. This unnatural thickness and solidity of the bag of the heart was uniform, or the same every where; and when it was laid open fully, its interior or cavity, presented a singular spectacle. The apex of the heart cohered firmly to the bottom of the sac, and every part of its body and sides was tied to the interior of the pericardium, by fibrous interlacements, of considerable length, but so close and strong as to present the appearance of a dense net-work, that could not be broken down by the fingers, by any common force. The cavity of the bag of the heart in fact, was a perfect web of fibrous or filamentous formations, about the size of large sewing cotton, crossing each other in every direction, and filling almost completely the naturally free space between

the heart and its capsule. The body of the heart itself was unusually pale, almost white, and instead of its proper smoothness, its exterior was overspread and roughened by indentations very much resembling the pits of small-pox, apparently the remains of extensive punctated ulcerations.

Remarks.—All the appearances about the heart, noted in examination, were plainly effects of some ancient inflammation, which from the consequences, could hardly have been slight. It is manifest that both the heart's substance and its investing sac must have equally participated in the morbid actions which bound them together by such a multitude of preternatural ligaments. Yet from the patient's account of herself, her report of general good health, and almost total exemption from sickness until very recently, the laborious nature of her occupation, regularly followed until the commencement of her late illness, and from her personal condition, fleshy and well nourished, it would appear, first, that the time and circumstances of the morbid development in the textures affected, was not marked by corresponding signs of illness or danger; and secondly, that the great lesion of structure betrayed by these parts, had not afterwards materially interfered with the important function performed by the heart, and did not sensibly abridge the comfort, or impair the health of the individual, to whom had occurred a change replete in contemplation with so many probable and serious evils.

Case III. *Carditis and pericarditis—suppurative, chronic.*—Ferdinand Gibbs, a black man, about thirty years of age, admitted into the Baltimore Alms-house, December, 1831. This man was above middle size, person well-formed and muscular, exhibiting the appearance of a vigorous organic system, but little impaired by sickness or former disease. There was no emaciation, nor any manifest constitutional derangement or chronic malady. The symptoms on admission were those of ordinary febrile catarrh, or what is usually called a bad cold; patient had cough, hard, and somewhat frequent, attended by soreness in the breast, and slight hoarseness; no fixed pain in the chest, nor any palpable impediment to free respiration; cough not sensibly excited or exasperated by deep breathing. Fever was moderate; pulse about 90, full and soft, no discoverable irregularity; temperature nearly natural. Patient represented his cough to be more frequent and harassing when lying down than in sitting, standing or walking about; present indisposition reported to have existed about two weeks. Diagnosis—subacute inflammation of the sero-cellular tissues of the thorax; in other words, serous pneumony or catarrh.

Treatment.—Rest in bed, low diet, antimonials, and an epispastic

in front of the chest. On the third day in hospital, patient was nearly free of fever; said he was well enough to be up, and solicited permission to leave his bed, as also indulgence in stronger diet. Permission was granted to be out of bed, but with orders to remain in hospital; diet regimen continued as before; medicine omitted. In the night of the following day, the fourth after admission, this man, without unusual complaint, or being known to have been more unwell than common, was discovered about midnight in a state of insensibility, and rapidly sinking. Respiration was short and sonorous; surface cold; pulse extinct; limbs relaxed. He died in a few minutes after being discovered in the state described.

Examination.—On opening the thorax the portion of the mediastinum immediately under the sternum presented appearances of recent inflammation in a moderate degree; cellular tissues tinged red, and slightly infiltrated with lymphy matter. The upper anterior surface of both lungs was also marked by superficial phlogosis; serous covering of the lungs redder than natural. The substance of the lungs was every where soft and pliant, without signs of condensation, or other evidence of altered state or texture.

The pericardium was excessively dilated, occupying all the middle space of the thorax, pressing the lungs aside, and forcing them high into the superior regions of the chest. This great bag contained a fluid, which proved on incision to be matter of a light yellow colour and uniform consistence, exhibiting the qualities belonging to what is called laudable pus. The quantity of matter contained in the pericardium was supposed to exceed one gallon; much of it was effused into the cavity of the thorax at the moment of incision, yet enough was collected to fill a common tin wash-basin. The interior of the pericardium, and the surface of the heart, were somewhat roughened by flocculent lymph, though not otherwise unnatural in appearance or condition; there was no excess or intensity of colour upon those surfaces indicating acute or recent phlegmasia. The heart itself was of the ordinary size.

Remarks.—This case strongly exemplifies the possibility of severe phlegmasial action on the surface of the heart, without serious embarrassment of its special office as the principal organ of circulation; the centre and salient point of the distributive system. There was here no palpable manifestation of impeded action of the heart, nor any appreciable defect of full and regular supply of the important material of excitement and nutrition to all the organic systems. The man neither acknowledged nor betrayed any feeling or sign, importing imperfection or incapacity of circulatory power. He was not affected

with labour, hurry, or shortness of breathing; he had no pain in the region of the heart; no distress of countenance; no coldness of the surface, nor any infiltration of the lower extremities, or of the cellular tissue in other parts of the body; position of body was not known to produce any symptoms referrible to interruption or disadvantage of action by the heart, although cough was provoked or increased by lying down, yet there was no particular sense of oppression in this posture, nor greater inability to lie on one side than on the other. The pulse was free, moderately full, and not discoverably unequal or irregular; not sensibly altered by change of posture; no sudden failing of its force or evenness by muscular efforts; no tumult or flutter of movement under these circumstances, and no tendency to collapse or syncope; the man walked about the ward with apparent ease on the day preceding his sudden death.

The most remarkable phenomenon in this case, is the complete nutrition of the body, which had been maintained under chronic disease, so serious in kind and degree, affecting the main organ of supply, for all the material of growth, and repair of parts. It was manifest that the immense collection of pus in the bag of the heart was no late or sudden accumulation. Its formation was a work of time, and had commenced long before his late sickness, but when, or under what circumstances, could not be determined. The patient's account of himself, went no further back than the date of his recent illness by cold, about two weeks prior to admission, and there was nothing in his appearance or symptoms to induce inquiry concerning his state of health at a more remote period. He had the external, (personal,) marks, of a sound condition of all the important organs, and it is curious how this fact could have consisted with the state of things revealed by examination.

Case IV. *Aortitis.*—F. Scott, a man about thirty-five years of age, dark hair and eyes, short stature, person corpulent, was admitted into the Baltimore Alms-house, October, 1831. Symptoms on admission as follows:—Face slightly swelled or bloated; countenance pallid; look dejected, anxious, and expressive of suffering. Respiration was quicker than natural; breathing performed with some difficulty, and obvious voluntary effort, apparently imperfect, or insufficient to supply the demands of the pulmonary system; both the endeavour to obtain more air, and the defective supply of that want, were strongly represented in the manner of breathing. There was no cough, nor any positive soreness within the chest; wandering pains were occasionally experienced in various parts of the thorax, not constant in any region or seat; voluntary inspiration, not painful, but a good deal

limited, or less complete than natural; oppression of breathing was sensibly increased on lying down; patient rested in the half-recumbent posture. By percussion, pectoral resonance very obscure over the left half of the chest; on the right side sound more distinct, but duller than natural.

The pulse was frequent and vibrating, rather small, easily compressed, and hurried into some irregularity by any slight exertion. Action of the heart diffused, felt over larger thoracic space than common, and imparting a visible jar or shock, to the upper part of the trunk. Temperature of the body warmer than natural; lower extremities enlarged, rather hard, œdematous in some degree, pitting slightly on pressure. *Diagnosis*—carditis and pericarditis, in the secondary or lymphatic stage; hypertrophy of the heart; water in the pericardial sac, and moderate hydrothorax.

Treatment.—Sedation was indicated; degree moderate, and if possible uniform. Directed rest in bed; bleeding, general and topical, regulated by circumstances; varying grade of excitement, predominant symptoms, state of pulse, and effects; amount and repetition of either general or topical bleeding, restricted to the purpose of lessening the struggles of the heart, liberating the breathing, and calming nervous and vascular tumult. Medicines—digitalis, calomel, squill, and henbane; doses and impression, according to general design. Diet wholly vegetable—milk in small quantity excepted.

Manifest abatement of the worst symptoms ensued to the plan of treatment carried on for ten or twelve days; and its salutary influence was alike confirmed by the better looks of the patient, as well as his distinct avowal of improved feelings and greater comfort; frequency of pulse was brought nearer the natural rate; the heart's concussive force abated; surface temperature reduced; and the functions of relief, by the skin, kidneys and bowels, sensibly promoted. Œdema of the lower extremities was also removed, and the tendency to infiltration for the present suspended. By these changes the patient lost great part of the expression of distress betrayed on his admission into hospital, and ceased to be so much an object of interest and concern as at first.

The patient's continued amendment led to permission to quit his bed in the day, with the limitation of confinement to hospital, (the weather being cold and damp,) and restricted diet. He was about the ward for many days, still improving in appearance and strength, when he became again a good deal indisposed by an attack of catarrh, or influenza, epidemical at the time. After slight chill, with headache and fever, he had short, oppressed breathing, dry cough, and

constant soreness, amounting sometimes to smart pain, in the left breast, between the third and fourth ribs, not far from the sternum; skin was hot; pulse frequent, small, and variable; countenance bloodless, with a strong sallow tinge. On the second day of the patient's renewed illness, he was suddenly affected, after some hours of great embarrassment of breathing, with convulsive struggles, ending in unconsciousness of some duration, (resembling deep and protracted syncope,) and followed by extreme prostration. He recovered slowly from the state just described, and for some days appeared to be gradually escaping from the effects of the cold recently contracted. Fever abated, cough lessened, and pain of the left breast was nearly lost; the breathing continued more laborious than before the late attack, and was rendered quick and panting on making any unusual effort. On the eight day from the attack of influenza, this man, after having sat up for some hours, and walked occasionally a few steps from his bed, was again overcome suddenly with great faintness, followed immediately by powerful spasmodic motions, great difficulty of breathing, and with appearances, not noticed in the former attack, of strangling or suffocation. These threatening symptoms increased rapidly, until they terminated fatally, in about thirty minutes from the time of invasion. The pulse in both this last, and the former spasmodic attack, was small, feeble, and fluttering. In the convulsive paroxysm which ended fatally, the face, neck, and hands were livid; the first almost black, general surface preternaturally cool, approaching absolute coldness.

When the issue of this case was mentioned to me, (together with the manner, and a particular detail of the symptoms preceding death,) by the intelligent young gentleman who had treated the patient, Dr. W. M'Clennan, inquiry was made by him, to what the occurrence of convulsions, the signs of suffocation, and sudden death, were to be attributed; whether to sudden cerebral congestion, or to fatal cardiac or pulmonary embarrassment, by excessive serous accumulation in the pericardium or thorax. From the circumstances, it appeared to me that neither of those were the cause of the late symptoms and the event. The true difficulty seemed to exist in some condition of the heart itself, interfering with the proper exercise of its transmitting office, and involving a liability to sudden and serious interruption, or suspense of that function. The most probable affection of the organ indicated by the symptoms and the consequence, was some morbid state of the valves at the root of the aorta unfitting them for the due performance of their office; the particular change which the parts in question were supposed to have suffered, was thought to have

been recently developed. Valvulitis, or inflammation of those delicate structures which serve as lock-gates at the mouth of the ventricle, it was believed, had deprived them of the attributes by which, in a healthy state, they contribute to the uniformity and effect of the circulation. To a virtual failure in the office of transmission, from the cause assigned, was referred the violent tumult, sudden overthrow, and speedy collapse, of the sensorial and vital functions.

Even on the supposition that the valves at the origin of the great vessels were nothing more than finely contrived pieces of animal mechanism, wholly passive themselves, and acted on merely by the forces of pressure and counter-pressure, the changes wrought in them by inflammation, by altering their bulk, and destroying their pliancy, would be sufficient to unfit them for the service to which they had been appointed. But from all the analogies of vitalized organism, it must be conceived, that the valves possess and exercise inherent powers of adaptation to their design, by which they are accommodated to the successive impulses of the issuing currents, and again, at the proper moments, erect themselves into due apposition, to sustain the impending column of fluid, until its pressure is taken off by the rapidly renewed exertion of the propulsive power—partly of the heart, and in part, perhaps in great part, of the tube which conveys it forward. In either view of the manner of subservience to the circulation by the valves,* the change of structure, size, &c. which inflam-

* Our knowledge of the office of the valves of the great arterial trunks may be at most but partial and imperfect; resting too exclusively perhaps on mechanism and analogy. There appears some reason to doubt whether the valves at the root of the great arteries are placed there merely as barriers against a refluent tide of blood—or checks alone, on the gravitating force of the mass of fluid before them: in other words, whether they are only supporters of the weight of blood above them during the diastole of the ventricle. It appears probable that the valves in question are placed where we find them for other and active uses, and that they were in fact organs of adaptation, intended as much for the purpose of regulating the quantum and force of the currents moving by them, as defences or supports against any tendency or properties of the fluids beyond them; thus constituting an active part of the apparatus of circulation. I cannot well conceive that the valves are alternately pressed close against the sides of the vessel, and again dilated in the reverse direction by a reäctive or opposite force. They are most probably always in a state of some erectility, varying with the variable momentum and excitements of the moving fluids and the motive forces—which excitements of the latter they participate, and act in concert. Some of the reasons for this opinion are briefly as follows. If at every systole of the ventricle we suppose the semilunar valves to be laid fairly down upon the sides of the vessel, how is the office of nutrition to the heart itself effected—as the valves pressed close must cover and obstruct the

mation is capable of producing, might unsuit them to the end designed, and it has long been placed beyond speculation or doubt, whether palpable alteration in the condition of those delicate membranes might become the occasion of sudden and fatal check to the distributive office of the central organ of transmission.

Examination.—Thorax. Cavity of the chest partly filled by free serosity; moderate hydrothorax. The pulmonary membranes, and lungs themselves, natural in appearance, without signs of recent in-

mouths of the coronaries of the heart. On this point one of two things must be admitted—either that the valves do not fall back entirely under the impulsion by the ventricle, and thus shut up the coronaries while the jets of blood pass—or else, that the coronaries are supplied, not as the blood issues from the ventricle, but by a reflux movement of the blood in the aorta, taking place in the pauses of ventricular contraction. It would then be a backward movement of the blood, which, after pressing open the valves, fills the coronaries. This admission not only puts the contraction of the ventricle, and the filling of the coronaries, wholly out of correspondence in time, but contradicts likewise the idea so familiarly entertained, and often figuratively expressed by the remark, that the heart's charity begins at home—in other terms, that the vessels which nourish the heart's substance, receive the first issues of fresh blood.

There is some difficulty also in conceiving how, when the valves are laid open close upon the vessel by a column of blood acting as a dilating force, any quantity of fluid can insinuate itself behind them, sufficient to throw them fairly back, so that they may serve as complete lock-gates against a retrograde movement of the distending fluid. This difficulty would not be hard of solution if it were manifest, or could be demonstrated, that the impulsive force which threw the valves down upon the sides of the vessel was absolutely intermitted, and pressure of the fluid completely taken off, for a space long enough to permit momentary refluxes of the column of blood; thus showing in the blood's movement through the mouth of the great vessels, (the aorta, for example,) the variations of an active and passive state; in other words, the alternate effect of projectile force and gravitation. But are we justified by any known facts or analogies, in conceiving that there ever is, even for a moment, an absolute stasis, or a perfect remission of pressure, of the blood of the aorta? The *continuous stream* of arterial hæmorrhagy, from all considerable vessels, seems to decide this question in the negative, the more positively, inasmuch as in hæmorrhage the gush of blood is the more constant and equal, in proportion as it issues more nearly from the aortal fountain.

There appear to be physiological reasons, which need not be urged in this place, why the valves of the great arteries should possess properties of adaptation to the varying quantum and force of the fluids to which they give passage. The variable states of repletion and excitement of the heart and great vessels, in the different circumstances of health and disease, seem to require the exercise of adaptive powers by the valves to preserve the circulation from the disorder or imperfection to which it might otherwise be liable, under the very great diversity of state and influences to which it is subject.

flammation. Pericardium occupying more space than usual, somewhat developed by fluid contents, though not so replete as to appear distended. Division of the membrane showed pericardial dropsy to the amount of five or six ounces; fluid clear, or only tinged slightly yellow—not reddish, turbid, or flocculent. The colour of the heart was natural; its bulk and weight exceeding the common size, &c. of that organ, showing manifest hypertrophy or morbid increment; the walls of the heart were thicker and more solid than usual; chambers about the ordinary capaciousness. When the ventricles were laid open and washed out, it was very apparent that the lining of those chambers about the roots of both the great arteries was highly inflamed. The membrane at this part was deeply florid, and evidently thickened, so as to appear raised up, and somewhat ridged or plaited. The valves partook of the strong red colour just noticed, and were palpably thickened, appearing far more fleshy than natural. It was at the root of the aorta more especially, that the red hue of the lining membrane was found to predominate in the highest degree; the colour at this point was particularly deep, or what might properly be called excessive; the valves here were also more red, and more thickened, than at the root of the pulmonary artery. A like distinctness of the traces of inflammation, the same intensity of colour so prominent at the mouth of the aorta, overspread the internal tissue of that tube for some inches from its root, fading gradually toward the arch, and insensibly lost within the extent of the curve. The lining of the aorta was much thickened, and presented very distinctly successive plaits or folds, arranged in the transverse axis of the vessel.

Case V. *Carditis—valvular inflammation—calcareous deposition.*—J. Ronalds, a black man, barber by occupation, forty-eight years of age, long resident in the Alms-house, was received into the African Infirmary of that Institution, July 8th, 1832, on account of a catarrhal affection, with considerable fever. This man was small-sized, lean, phthisical conformation, and subject to attacks of rheumatism, not violent, nor often preventing attention to his customary employments; shaving the inmates of the establishment, and performing light work of various kinds.

The symptoms of this case on admission into hospital, represented the muco-catarrhal form of fever, complicated by gastric irritation, of moderate intensity. Complaint was made of some pain, and considerable sensibility to pressure in the region of the stomach. Slight soreness over the middle of the breast, along the sternal line especially, and some cough; thin mucous expectoration. There was no fixed or sharp pain in any part of the thorax; and little more confine-

ment in breathing than common; the patient's respiration, by his own report, being habitually impeded, or less free and perfect than is natural in good health. The skin was warm, as in moderate fever; pulse small, frequent, and vibratory, occasionally intermitting; tongue white, and moist; bowels rather loose. The functions of mind were natural and regular, patient's intelligence unimpaired, look and manner calm and rational. From all that appeared the case presented under first examination, little evidence of suffering and no manifest signs of urgent danger. It was regarded, namely, as fever of irritation from cold, with some degree of inflammatory development in the gastric and pulmonary mucous tissues—a character of disorder common in the Alms-house and elsewhere at the moment.

There were some peculiarities in this patient's state, which early attracted particular notice, and excited conjecture on their cause and interpretation. It was manifest, even to superficial observation, that the action of the heart was wholly disproportioned to the condition of the pulse; the excitement of that organ was too great, more properly excessive, when compared with the small volume and feeble stroke of the artery at the wrist. This over-action of the heart, was sufficient to impart a very perceptible motion to the trunk of the body; a visible shock or jar, which answered to the impulse of the heart, and demonstrated both the force and frequency of its stroke. The heart's percussion was also felt distinctly over a much wider region of the thorax, than its beat can be discriminated in the natural contractions of that organ.

A remarkable consequence of this disordered movement of the heart was displayed in an interesting manner, by its effect upon some of the veins of the neck. The blood in the superficial veins of the right side of the neck, the external jugular and humeral veins especially, exhibited a constant oscillatory movement, resembling pulsation rapidly renewed. Some degree of pulsation could be distinguished by the touch in this set of veins, (which were greatly enlarged just above the clavicle,) but it was feeble, quick, and tremulous; and it was found by attentive comparison, that the oscillatory movement in the veins did not correspond to the pulse in the arm; the former being much less distinct, and more frequently renewed than the latter. The blood's motion in the veins at the root of the neck consisted in reality, of quick successive undulations rather than pulsations, properly so called.

The disproportioned action of the heart in this case, as compared with the tone of the general circulation, the range or extent, together with the seeming force of its percussion, implied either a particular

temporaneous state of excitement, some special stimulation to extraordinary efforts, or else a preternatural condition, a permanent change in the size, capaciousness, &c. of that organ. Hypertrophy* of the heart was indicated by the signs; a condition of the organ, the more palpably betrayed, as was supposed by the tumult and disorder of the febrile state. The very obvious and singular undulatory motion in the blood of the lower cervical veins of the right side, appeared to be susceptible of explanation, on one of two suppositions; either that the action of the heart, at each renewal of its strong contractile efforts operated as a repercussive force, and imparted a species of refluxion to the blood of the right auricle, which being communicated to the blood of the cavas, was rendered perceptible in the nearest principal branches. This appeared one of the possible or probable causes of the constant undulatory movement in the veins at the root of the neck. Another explanation of the phenomenon in question, it was conceived, might be founded on the supposition of some imperfection in the office of the valve between the right auricle and ventricle. It was deemed most likely that there existed some morbid state of the tricuspid valve, which rendered the partition of the two right chambers incomplete, and permitted the contractions of the right ventricle to impart motion to the blood of the auricle; and that thus a series of reflected impulses might be manifested in the blood of the lower veins of the neck. Ossification, earthy degenerescence of the chordæ tendineæ of the tricuspid valve, was regarded as the cause of the imperfection presumed to exist in the office of that valve.

The case unexpectedly ran on a protracted course, assuming constantly, though gradually, a more unfavourable aspect; and with little variation of the symptoms above noticed, glided into a low grade of ataxic fever. Without any prominent local affection, or special embarrassment of particular functions, except the disordered action of the heart before described, and without the signs or acknowledgment of sensible pain or distress in any definite seat, the patient prostrated continually, until his debility became extreme, and his condition hopeless. The phenomena attending the progress of the case, were chiefly those of diffuse irritation of the mucous tissues, betraying in the character of the symptomatic fever, and the increasing coloration of the tongue, fauces and gums, the gradual spread of morbid sensibility to the submucous and deeper organic textures, and a correspondent aptitude in the vascular apparatus of these structures to

* Enlargement, with dilatation of the ventricles; aneurismatic state of the heart.

congestive embarrassments; the inequalities or excess of capillary repletion, which ensues to undue exaltation of the sense of feeling or susceptibility, every where the attribute of vital endowment, and manifests both the signs and effects of that engorgement, alike, and often equally, in the asthenious state, as in the sthenic condition of the system and the organs.

The over-action and struggling movement of the heart continued to be plainly distinguishable in every stage of the case; and the undulatory motion in the veins of the neck remained equally manifest; the intellect was also true and correct throughout, and was unusually free of dullness or disorder to the last. Death took place in a gradual quiet manner on the 26th of July.

Examination.—Thorax, lungs, and pulmonary membranes, natural appearance, except a heightened tinge of colour over the whole, from general injection of the fine capillaries; colour equally diffused. Some excess of serosity in the anterior cellular tissues of the chest; no manifest accumulation of free fluids in the sacs of the lungs, or cavity of the chest; no hydrothorax. Pericardium, moderate dilatation, reddish hue externally, colour deep red in patches, particularly where the sac covers the superior anterior portion of the left ventricle. Some fluid collection in the pericardial cavity; fluctuation obscure, as from defect of pliancy in the investing membrane by unnatural thickness and firmness of texture. Incision of the sac proved it to be much thickened, and revealed unexpectedly the strongest marks of recent and high inflammation, both of the inner coat of the sac, and of the heart itself. The surfaces of both were glued together in many places, by large masses of fibro-gelatin, of deep yellow hue and apparently recent formation, the membrane which forms the covering of the heart and the lining of the sac exhibited strong general excess of colour, deepened in places to the extent of red ecchymosis; the highest colouring at the base of the heart over the superior portion of both ventricles in the greatest degree over the left. Lymph was effused, more or less on every part of the heart and interior of the sac; amount of water in the cavity not sufficient to distend the bag in any considerable degree. Moderate enlargement of the heart, some extra development in both chambers, most apparent in the left; density of wall of those chambers unequal, greatest above, softer in the middle region, feeling thin and flaccid towards the point. The apex of the heart was less acuminated than natural, giving a rounded appearance to the organ, and diminishing its usual conoidal shape.

The right ventricle was laid open freely in order to examine the tricuspid valve, the cords of which it was expected would be found

in a state of earthy conversion. Examination proved that idea to be in great part erroneous; a very partial change only of this kind was discovered on one of the tendons of the valve, not sufficient apparently to destroy its pliancy, or interfere with its office. The whole valvular apparatus however, exhibited very distinctly a condition equivalent in its effects to positive and permanent degeneracy of structure. Every portion of the valve was highly inflamed; the cords, fleshy pillars, and the reticular curtain stretching along their base, were all thicker than natural, and reddened in the extreme; the height of colour strongly contrasted with the naturally florid hue of the columns and lining of the ventricle. This excess of colour was circumscribed, and defined by a circuit around and near the base of the columns.

The auriculo-ventricular system of the left chambers was found on examination, very different from that of the right; the mitral valve was quite pale, as it usually appears in the natural condition of the parts.

The similunar valves of the pulmonary artery were free of any morbid signs, without marks of inflammation, and showing nothing of concretion or earthy change. The corresponding valves of the aorta were thicker, two of them especially, than in the healthy state, but not more highly coloured than natural; the corpus aurantii of one of the valves, (the right,) somewhat enlarged and earthy, all other parts of the valves soft, though denser than common. But although the valves here were not themselves much changed, or actually degenerated, a very uncommon amount of earthy matter was found deposited in the little pockets, (sigmoid sinuses,) at their roots. In two of those cavities, the masses of calcareous matter were large as full-sized garden peas; those concretions were imbedded in, and nearly enclosed by the fine membrane lining the cavities in which they lay, and effectually prevented the valves from being thrown down in contact with the wall of the aorta, the valves were pressed open and permanently dilated, by the concretions occupying the sinuses; they, these two valves, were also shortened and thickened.

The internal surface of the ventricles, and the lining of the pulmonary artery, and of the aorta, were natural in appearance, colour pale red, and uniform.

Case VI. *Carditis and aortitis—secondary.*—Elizabeth Crouse, forty-five years of age, long resident in the Alms-house, died in that Institution, August 9th, 1832, after a violent attack of gastro-encephalic fever, brought on suddenly eight days before, by eating extravagantly, (reported to great excess,) of meat and potatoes. The signs of irrita-

tive congestion in the stomach and brain textures, were strongly marked by extreme sensibility to touch in the one seat, and characteristic functional and physical disorder, (partial stupor, unsteady intellect, flushed face, and injected eyes,) in the other. Pulse was irregular, full and throbbing for some beats, then smaller, frequent, and jarring; heat of surface feverish; head painful; tongue, white surface, dotted with large red granules, rather dry; sub-surface, lingual substance, redder and darker red than natural. Patient had vomited part of the food taken, but no present irritability of stomach or bowels.

The treatment consisted in general bleeding, repeated, (blood sizy;) cupping renewed in various seats—temples, epigastrium, sub-occipital spaces and cervical spine; semicupium; laxative enemata; ablution frequently of abdomen with cool spirit lotion. Regimen, bread water drink and diet. Very little medicine was ordered, at first oil emulsion to moderate catharsis, aided by enemata, afterwards sedative draughts, (alkaline,) and diaphoretic aperients—small antimonials, pulv. jacobi, and tart. solubile. Partial amendment appeared on the second and third days; patient's looks improved; intelligence more correct; tongue moist, and better colour; abdomen less tender; pulse and heat nearly natural; patient had now some cough and bronchial excretion, as in slight mucous catarrh.

The symptoms of mucous pneumony went on to increase, not however to a severe extent, and fever revived gradually with its primitive characters of great irregularity in the pulse, and now with much more of irritative, and less of power than formerly; signs of accumulative morbid sensibility; new fluxionary movements in the stomach textures were also renewed, by extreme tenderness again to the touch, and deep red hue of the fauces and tongue. These indications of concentrative gastral phlogosis augmented constantly, though combated by the best means which occurred to us, cupping again the epigastrium, and subsequent blistering; and the patient sunk with a rapidity, not common even in the severer forms of congesto-irritative fever. The cerebral organism betrayed less embarrassment in the latter than in the earlier stages of the case; the functions of mind were less dulled or disordered than at first; the spinal encephalon, (spinal portion,) however was involved very manifestly in the advanced period of the case, as appeared from constant twitching in the muscles of the neck and shoulders; tremor of the hands, laboured breathing, and more than all, instant shrinking from the touch in the back of the neck, with quick and constant renewed convulsions of the face when pressure was made about the occipital hole.

Examination eight hours after death.—As was expected, the organic textures of the stomach showed deep and general phlogosis; they were cherry-red throughout, the colour not patchy, or heightened in places, as is common in mucous gastritis of ordinary intenseness, but uniform, as though the coats were thoroughly dyed red; the fine arborescence of the coronaries, and spleno-gastric arteries, was marked in the depth of colour which pervaded the stomach textures. This state of the gastric tissues had been foreseen, and was easy to foresee, but consequences were discovered in the thorax which had not been anticipated. The lungs were natural in appearance, every where except the margin of the left lung, where it touched and cohered with the higher part of the pericardium; there it exhibited a deep red border, or fringe, an inch broad on the body of the lung, and of rather more extent along its margin. The pericardium was reddened very highly over its whole surface, in a particular degree where the inflamed margin of the lung was in cohesion with it. The sac when opened exhibited marks of inflammation within, equivalent to those on its outer surface; the covering of the heart also, the left side especially, was strongly marked by the hue of inflammation, and a thick coating of lymphy matter; the corresponding internal surface of the pericardium was coloured deeply, and covered with lymph excretion in the same manner as the side of the heart. The sac contained but little water.

The left ventricle was plugged with a large clot of fibrin, extending toward the mouth of the aorta; when this was pulled away, a mass of dense yellow gelatin, (fibro-gelatin,) remained adhering to the smooth portion of the ventricle leading to the aorta, and occupying the greater part of the aortic canal, some way above the valves. This body of lymph was very different in appearance from the clot of fibrin taken out of the ventricle, the latter was grayish white, as usual in the blood coagulum, (polypus of the ventricle,) found sometimes, often immediately after death; the matter in the mouth of the ventricle and root of the aorta was yellowish, with a tinge of red, not lying loose on the lining membrane, but adhering to it with considerable firmness of attachment. When this lymph excretion was removed, the membrane underneath was found thickened, deep red, and pulpy; the same appearance encircled the lumen of the artery, its lining was thickened, prominent, and intensely red. The depth of colour continued extreme, as high as the arch of the aorta, and was not greatly abated before passing the bend of the vessel downwards. The other chambers of the heart showed no marks of disease; the heart itself natural in size and form, and without obvious vestiges

of ancient inflammation. On account of great heat of weather, the examination was not prosecuted within the encephalon, to discover the extent of cerebro-spinal arachnitis, represented by the signs throughout the case.

Inflammation of the heart, in a special degree, was not suspected in this case. The supposed, and no doubt the real exciting cause of sudden and severe disorder in the gastric and cephalic systems, the character and force of primary impression, and secondary involvements, was deemed sufficient to explain the nature, course, and violence, of all the symptoms; and there did not appear in the progress of the case, any evidence respecting the state of the heart itself, of a stronger or more significant kind, than is usually manifested by the participation of that organ in acute and exalted forms of irritation, when from local and concentrative, it becomes radiating and distributive, universal, or constitutional. There was palpable irregularity in the pulse, and more of the struggling action, throbbing, than is generally present in fever of mucous origin, (morbid sensibility, or phlogosis of mucous tissues,) but the character and range of disordered action in the pulse, is known to vary greatly under constitutional differences of irritability in the heart and arteries, as well as from peculiar states of aptitude or susceptibility, in parts of the vascular system, the effects of morbid association confirmed by habit, and readily provoked under casual or temporary excitements. The signs which might have given to the pulse a character more significant of heart affection, were either altogether absent, or not sufficiently displayed to attract notice. There was no greater shock or jar from the percussion by the heart, than is common in many forms of fever where carditis does not exist. There was no acknowledged pain in the region of the heart, and none of that characteristic anxiety depicted on the countenance, when this organ is acting under the constraint or suffering of inflammation in its own texture. The acts of breathing, until near the crisis of the case, were regular and uniform, unattended by any apparent, or avowed difficulty, and without the kind or degree of embarrassment common in carditis, and requiring the frequent or habitual change or elevation of posture, instinctively sought as a means of relief. The tendency to syncope on exertion, and occasional sense of suffocation, concomitant of unequal and insufficient propulsive action by the heart was not felt, or was partial, and escaped observation; the patient was restless, and required to be gently restrained at times from indulging a disposition to get out of bed.

At what epoch of the case inflammation of the heart and aorta were developed, is wholly conjectural. It most probably commenced in a degree promptly with the spread of organic irritation from the, (gastral,) seat of primary impression, and was one of the early displays of secondary textural sensibility in excess, or with congestive tendency. If such was the case, the disposition to phlogosis in that seat would appear to have been suspended for a time, during the mitigated stage of the case, and to have acquired new activity with the revival of general irritation, accompanying the invasion of pneumonic catarrh. Probably inflammation of the pulmonary mucous tissues, developed after some days, was the final cause, both of the profound carditis, and the secondary arachnoid, (spinal,) engorgements, which marked the terminal periods of the case. The revival of partially expended inflammation in a particular texture, or its manifestation in a new seat, (vaguely termed metastasis,) is not an uncommon event in the course of fevers of irritation, restored or exasperated by cold, undue stimulation of food, and other causes; sometimes indeed, by what appears a spontaneous movement, accumulative property, of constitutional irritation, uninfluenced by any appreciable extrinsic or contingent agency.

The brief comment indulged in the preface to recital of some of these cases, is borne out by the inferences from facts in the foregoing reports; first, that inflammation of the heart and its appendages may have existed, even to the extent of palpable and severe lesion of the organic textures, without manifest suffering, commotion, or danger, proportionate to the particular seat and severity of such an affection, and without permanent or serious after interference with the proper functions of the organ; secondly, that it is not alone in strictly chronic phlegmasia of the heart and appendages, that the seat or severity of affection is masked by absence or obscurity of characteristic signs, or inadequate representation of disturbance or danger. In the second case reported, "suppurative carditis," the phlegmasial character and actions could not have been low or slight, which inundated the cavity of the pericardium to the utmost repletion, with a purulent product; yet there appears to have been no evidence of this exalted irritation in the coverings of the heart, either by the location or intensity of pain, or peculiar imminence of danger from menaced overthrow of the functions of the organ; at least the patient's appearance did not import recent extremity of illness, nor was there an avowed recollection of having passed through any peculiar suffering, or pressing crisis. It was remarked also, in the account of the case, that the

personal appearance of the patient, a few days only before his death, exhibited an uncommon instance of complete and unimpaired nutrition. After all due allowance for the inadequacy of our means of discriminating consequences of past morbid actions in the more important textures, and with every abatement for the imperfect employment, in the present instance, of the evidences we do possess, such cases are calculated to warn us against the expectation of a uniform correspondence between the seeming and the real state of the great organs; or of always finding, what however the physician should always seek, adequate evidence of the physical state and functional attributes of all the principal structures of the body, and the manner or degree to which they participate in any disarray of the functions of health.

Although the last cases recited, had their origin among the very common instances of fever, with gastric, pulmonary, or cephalic complication, and afford examples of carditis by secondary development or derived irritation, it is not to be inferred that special phlegmasia of that seat is apt to ensue as a frequent result of general febrile derangement from similar causes of introduction. I have met with more instances of a like character and kind, but in all such cases, and generally in all serious cases, the point, or points, of final concentrative irritation, is very much determined by the aptitudes to morbid association, created and left by former disorders of sensibility and action, or habitual derangements in structure and office, in the textures ultimately most concerned. A like remark, indeed, applies to all the cases reported, and to all similar instances of serious event from partial or equivocal representation of the signs and source of danger. The seats of final lesion, or the constitution at large, or both, it may be inferred, as a general rule, have been preöccupied by morbid actions more or less intense, which have run their course down to a point of structural or functional impairment, not incompatible with the continued, though less perfect performance of the general and special functions, yet not without a permanent incapacity to undergo a new, equal, and similar derangements of condition and excitement. Even a less violent invasion, or less severe train of disordered movements, are capable, under those circumstances, of causing irreparable lesion of structures, crippled by the impression of ancient injury, or of disturbing fatally the vital endowments of parts robbed of their original powers of accommodation or endurance. In these cases too, the general sympathies of association are more certainly called on, and more severely tried, and it will often happen,

that the offices of participation or diversion, sink under the appeal, yield to the first new shock, and passively abandon the contest, with scarce a show of resistance, or a struggle for the victory.

These observations apply with particular truth to a very common result of the renewed inflammatory diathesis in the seats of ancient inflammation of important textures; and I would add, of the serous textures more especially. The lymphatized condition, (hardened, pseudo-membranes, or adherent states,) of those textures are peculiarly unfitted to encounter new developments, even of slight inflammation, and the offices of the organ are often far more seriously encumbered, than by a much more severe original assault; the sympathies of relation in other organs and functions are also much more readily aroused, and much less able to resist. Hence the very frequent occurrence of adverse issue, from special affections, at first deemed light and unimportant, perhaps equivocal in kind, and scarcely painful, and which, even after inspection, may prove to have been of small extent, and superficial impression. Such are among the remote contingencies of ancient inflammation, suspended more properly than cured; the liability of textures crippled and respited, rather than wholly relieved. The serous tissues, as before remarked, exhibit the most common examples of the result referred to, and among them the cardial and pericardial membranes, the pulmonary and costal coverings, (pleuræ,) the serous tunics of the brain, without and within; the peritoneum, with its wide expansion over bowels, liver, spleen, &c. afford the frequent seats of revived, or often renewed derangements, and each inviting the nearer approach to danger, or fraught with consequences less visible than before.

It is not intended by the recital of the foregoing cases, or the commentaries they have suggested, to imply or inculcate the idea, that cardiac phlegmasia, acute carditis, in particular, is not ever, or commonly represented by severe or serious symptoms, or adequate and significant signs of the seat and nature of that affection. There is no design to controvert the accuracy of definition, or appropriateness of symptomatology, as generally received in relation to cardiac affections, especially those of the acute or idiopathic class. These, for the most part, have been truly reported by many writers on this order of diseases. Few local affections indeed are, or can be more distinctly or strongly represented in their signs, than those which affect primitively or specially the central power of circulation; the diagnostic symptoms of acute phlegmasia, of that seat, should naturally be, as they generally are, in fact, plainly revealed in palpable suf-

fering, and obvious disorder of function. The cases reported, show however, that the same force of display, or facility of discrimination, does not apply to morbid affection, or structural changes in the same seat, when these are insidiously formed, or slowly consummated, when they of secondary origin, or become consecutive results. Even affections essentially the same in kind, it would appear, are not represented by like degrees, or even modes of suffering, nor equal or similar interruption of the offices performed. The power of accommodation to morbid impressions, and even morbid changes of serious extent, would seem, in short, to belong to the textures of the heart, equally as to other structures, not alike endowed, in general opinion with the attributes of inherent sensibility, exalted vitalism, and importance of action. This is mainly what the recital of the facts given in the preceding histories was designed to illustrate; a contribution drawn from the records of disease, in behalf of our fund of physiological knowledge, rather than an offering of any real importance to the acquisitions or objects of pathological research. While diseases of the heart are often more seeming than real, they are also sometimes more real than apparent; the above report proves that it may be comparatively silent, when its condition is less safe, or its danger most urgent. The symptomatic affections of the organ, those which are developed on it by its relation to many sources of sympathetic excitement, are often most sensibly felt, most openly acknowledged, and plainly recognised; its own private or peculiar maladies, though far more serious, are sometimes less ostentatious, and not so readily distinguished.

Case VII. *Carditis, sub-acute—prolonged.*—T. Thompson, black man, was received into the Baltimore Alms-house, December 15th, 1831, on account of difficult breathing, attended with signs of dropsy. The man was middle-aged; person large; general marks of strong constitution; very little waste of flesh; debility moderate. Face of the patient was slightly swelled; abdomen rather tumid, with feeling of hardness; no palpable fluctuation. The legs were enlarged, thick around the ankles, every where very firm, yielding partially to pressure; pitting a little; hard œdema of lower extremities. The principal complaint made at present by the patient referred to his breathing; respiration was short and frequent, quickened very much on slight exertion; causing breathlessness, and failing of strength, sometimes approaching syncope. There was no pain in ordinary breathing, but when respiration was hurried by exercise, pain arose, and became fixed for a time in the upper part of the left breast, near the

sternum; this pain subsided after being some time still. No cough existed generally; cough however would always follow any unusual exertion which hurried the breathing; it was then a short, broken cough, with very little sound, and no expectoration; voluntary inspiration, in a state of rest, did not cause pain, nor provoke cough. Patient could lie very well on his back—with some inconvenience on his right side—not at all, for more than a moment, on his left; in the latter position breathing became difficult, with a feeling of great anxiety and oppression. Percussion over the chest gave natural echo, (pectoral resonance,) throughout the right thorax; dulled in the inferior portion, from encroachment on the lower part of the cavity by the liver—supposed to be enlarged. Left thorax, echo natural near the clavicle, weak a little lower; middle and inferior third of the left side non-resonant, stroke blunt and fleshy. Pulse rapid, (rate 120,) sharp and wiry, beat quick and abrupt, bearing pressure, and striking the finger with a jar, which gave the sensation of double strokes, or of second weaker beats instantly following every pulsation. Heart's impulse obscure, not attended by any visible shake of the chest; sound of auriculo-ventricular action, (succussion,) deep-seated and faint, scarcely audible. Temperature of body was natural; tongue clean; eyes clear; countenance calm; appetite sufficient; bowels regular. Examination of abdominal regions indicated considerable enlargement of the liver, simple increase of volume apparently, without confirmed indurescence, or seriously vitiated organism; belly tense—signs of ascites equivocal. Patient represented his illness to have commenced five weeks before, with chills, fever, shortness of breath, and great soreness in the top of his left breast; very little cough; complaints attributed to taking cold; manner of life laborious and exposed; moral habits irregular, sometimes intemperate. Diagnosis by the signs:—Carditis, sub-acute stage, still severe; pericardial dropsy, moderate; left lung extensively adherent; chronic pleuritis; liver enlarged; indolent phlegmasia—probably ancient.

Of all the structural lesions inferred from examination, carditis was supposed to constitute the cause of present symptoms, and the source of probable danger. The tumult of circulation, and prominent functional embarrassments, of respiration, &c. were attributed to high inflammatory irritation in the organic texture of the heart, to positive carditis, still severe, though now prolonged; an affection supposed to have been developed at the time indicated by the patient as the date of attack. The dropsical symptoms, anasarcous state of the limbs, &c. were supposed to be consequent on the same cause, viz. long-

continued over-action of the heart, with the spread and establishment of the inflammatory diathesis in the capillary arterial tissues.

With a full explanation of these views of the case, it was placed for treatment in the hands of my highly intelligent and zealous young friend, Dr. W. M'Clennan. General advice—strict rest, simple and spare diet. Medical management—brisk catharsis, repeated as required, to remove serous infiltrations, and abate actions favouring their accumulation; the means jalap and crem. tart., minute antimonial addition if necessary. After purging, the steady pursuit of moderate but uniform medical sedation; for this general object, laxatives daily, saline aperients, doses small; design, two or three motions in twenty-four hours; diuretics and sedatives in combination—the selection, calomel, nitre, squill, and digitalis united. General bleeding only, if heat of skin, head-ache, furred tongue, &c. betrayed febrile exasperation;* topical depletion by cups over left thorax, and repeated if pain became fixed, or frequently renewed; blistering at a more advanced stage of treatment if then indicated. The treatment was recommended to be carried on steadily to the extent, and with the design of moderate ptyalism.

The effects of the plan pursued encouraged perseverance in its enforcement, and gradually accomplished its intention. The anasarca, and some abdominal fulness quickly disappeared under brisk catharsis, and the relief obtained in this respect afforded the patient sensible comfort. The pulse abated its hurried movement, at first in a degree barely discoverable; even under smart purging, laxatives continued, a softened skin, somewhat liberal diuresis, and one pretty free cupping, the rate of action scarcely varied from its range over 120, stroke still quick, sharp and jarring. The constancy of these characters of pulse was remarkable in every period of the case, and more than any other signs served to denote and discriminate their cause. There was however a steady, though slow amelioration even in the pulse; its frequency fell off in some degree, while the character of *irritation* in it, its intensity, lessened manifestly, and we had the satisfaction of finding it by the end of the third week of treatment constantly under 100, softer also, more full, and with very little harshness or jar in the beat. Mercurial impression was now revealed in a moderate degree, and the after-treatment was directed to its preservation, within mild limits, sufficiently long to effect total subsidence of

* Incursion, perhaps more properly, as the hurried and sharp pulse in this case was not deemed evidence of fever, strictly.

special inflammatory excitement; to favour also resolution, if possible of much, or part, of old condensation of textures, pleuro-pneumonic and hepatic.

After two months care of the patient, with a constancy and sound judgment highly creditable to the gentleman in charge of the case, the success of treatment was complete, to the fullest extent we had regarded as possible. The tendency to dropsy was no longer apparent; no embarrassment of breathing was discoverable, or felt by the patient. He could exercise temperately without inconvenience of respiration, or inclination to cough, and could lie with ease on either side. Percussion over the chest produced natural echo every where, except the lower half of the left thorax; a considerable extent of the coverings of the lung on that side was lymphatized, permanently thickened and adherent. The pulse had settled at a standard seldom varying from 80 in the minute, soft, and equal in stroke. The natural impulse of the heart was restored, and its sounds in action, or the sounds of its contents depending on its actions, were audible in their customary order and force.

The patient was discharged from treatment—reported for light work. He remained about the establishment until the last of May, 1832, and then left the institution, apparently in good health.

Hypertrophy.—The following instance of hypertrophy of the heart is briefly communicated because it supplies a rare example of uniform and excessive overgrowth of that organ—a specimen of pure supernutrition of the heart.

J. Clemmons, mulatto, aged about fifty, large size, person corpulent, was admitted in the Baltimore Alms-house, June, 1831. Disease general anasarca, moderate ascites, and signs of hydrothorax. This man was represented to have been much oppressed in respiration when received into the house, and died on the night of the same day. On examination, his heart was discovered to be greatly enlarged, and occupied his thorax so fully, that it was supposed to have caused death by suffocation. From these circumstances, my attention was called to the subject by the gentleman engaged in the examination. The heart, when taken out, had all the appearances of healthy structure; firm every where, uniform in its condition, moderately fat, and without marks of old or new inflammation, and no characters of general or special degenerescence of texture. It was injected for preservation, and its dimensions are given below, from measurements recently made in its dry state, twelve months after injection. To appearance it has lost considerably in bulk by exsiccation. The di-

mensions of this heart are contrasted with those of an adult heart, (from a large subject,) also injected and dried.

	Hypertrophied Heart.	*Natural Heart.*
Circumference at the base - -	17½ inches.	10½ inches.
Circumference midway the body -	14½	9½
Circumference an inch above the apex	12¼	7¼
Length of the body from the top of the right auricle to the apex - -	13	6¾
Length of the body from the root of the pulmonary artery to the apex -	8¾	4¾
Circumference of aorta around the root	7½	3
Circumference of aorta at the arch -	6¼	2¾
Weight of heart - - - - -	5 lbs. 3 oz.	14½ oz.

Baltimore, January, 1833.

ART. II. *Observations on the Apocynum cannabinum.* By JOHN H. GRISCOM, M. D. of New York.

THE properties of the Apocynum cannabinum or Indian hemp, especially in a medical and chemical point of view, have been hitherto but little, if at all investigated, for I have met with no dissertation on the subject, and with but few medical men who have any acquaintance with it. This is the more striking when we consider that it is an indigenous plant, of great frequency in almost every section of our country, and possessed of properties which can scarcely fail to entitle it to a respectable rank in the materia medica, when they become properly known and duly appreciated.

Botanical History.—The term Apocynum is derived from the Greek Αποκυνον, (Diosc.) ἀπὸ and κυνὸς, because it was supposed to kill dogs. The Egyptians call this plant *ossar*, whence comes the name of the fruit bidessar, q. d. *Bordes ossar*, which in Arabic, signifies the egg ossar, the pods of the great Assyrian sort, being shaped like an egg.*

Of the Genus *Apocynum*, there are reckoned by botanists seventeen species,† of which the *cannabinum* is the second in order. It belongs

* Miller's Gardener's Dictionary.

† We have only *three* species of Apocynum, according to Nuttall and Eaton.

to the *Fifth* class, PENTANDRIA, order *second*, DYGYNIA of LINNÆUS, and to the Natural order *Contortæ Apocynæ* of JUSSIEU.

Synonyms.—Indian hemp—Dog's bane. It is most commonly known in this country by the name of Indian hemp.

GEN. CHAR.—*Calyx. Perianth* one-leafed; five parted, acute, short, permanent.—*Corolla.* Monopetalous, bell-shaped, semiquinquifid, divisions revolute. *Nectary*, of five glandular, oval corpuscules, surrounding the germ.—*Stamina. Filaments* very short. *Anthers* oblong, erect, acute, bifid at the base, converging.—*Pistils. Germs* two, ovate. *Styles* short. *Stigma*, roundish, bifid at the tip, muricate, glued to the anthers.—*Perianth. Follicles* two, long, acuminate, one-valved, one-celled.—*Seeds.* Numerous, very small, crowned with a long down. *Receptacle*, subulate, very long, rough, free.

SP. CHAR.—*Corolla.* Bell-shaped. *Nectaries*, five, alternate with the stamens. *Stem* straightish, herbaceous, leaves oblong, cymes lateral, longer than the leaf.

The foregoing characters, taken from MILLER, do not appear to coïncide entirely with those given by other botanists. There seems to have been some doubt among them as to which plant the name *cannabinum* should strictly be attached, and by the quotations from the authorities made below, it is sufficiently proved that there are several *varieties* of this *species*, and the *A. pubescens** described by R. BROWN, appears to be one of these

* Professor Eaton says, "Brown seems to have forced in an additional species, not found in nature."

varieties; its character is therefore subjoined to the others. There is not however, any probability that there is much, (if any,) difference in their medicinal virtues, therefore as no description yet given will apply to all the *varieties*, and as any plant which will agree with any of these descriptions, may be safely taken for *Apocynum cannabinum*, practitioners in different parts of the United States, or elsewhere, who may wish to use this medicine, may be saved from inconvenience and expense.

Apocynum.—*Calyx* very small, 5-cleft. Corolla campanulate; border with 5 short, spreading, or revolute lobes. *Anthers* sagittate, connivent, cohering to the stigma by the middle. *Glandular teeth* 5, acute, alternating with the stamens, and opposite the segments of the corolla. *Styles* obsolete. *Stigma* dilated, and conical at the apex. *Follicles* 2, long, linear. *Seeds* comose.*

A. cannabinum. Leaves lanceolate, acute at each end, glabrous; cymes paniculate; calyx as long as the tube of the corolla. Observation. Stem herbaceous, 2 or 3 feet high. Cymes lateral, longer than the leaf. Flowers greenish-white.

A. pubescens. Leaves ovate-oblong, mucronate, obtuse at the base—on both sides, and with the shorter cyme, pubescent; calyx nearly as long as the corolla. Observation. Stem herbaceous, 2 or 3 feet high. Leaves almost tomentose on the under surface. Cymes terminal. Flowers greenish.—*Elliott's Sketches.*

A. cannabinum. Leaves oblong-oval, with hoary pubescence underneath; panicle pubescent; the limb of the corolla erect. Observation. Leaves and flowers greenish-white, or yellowish-green.—*Barton's Compendium Floræ Philadelphicæ.*

A. cannabinum. Leaves oblong-oval, acute at each end; cymes paniculate; limb of the corolla erect. Observation. There is some variety in the leaves of my specimens; some being oblong-oval, and others lanceolate and tapering at base; or possibly I may have blended the two species *A. cannabinum*, and *A. pubescens.*—But if they are really distinct, they closely resemble each other in habit.—The *pubescence* is but slight in any of those which I possess.—*Darlington's Florula Cestrica.*

A. cannabinum. Stem upright, herbaceous. Leaves oblong, tomentose beneath; cymes lateral, longer than the leaves.—*Loudon's Encyclopedia of Plants.*

A. cannabinum. Leaves lanceolate, acute at each end, smooth on both sides; cymes paniculate; calyx as long as the tube of the corolla. Observation. *Stem* erect, slender, branched, purple, a little glaucous. *Leaves* 2 or 3 inches long, and three-fourths of an inch broad, on short petioles, attenuate at the base, very smooth. *Cymes* many flowered, paniculate, smooth, segments of the *calyx*,

* The generic character here copied, is taken from Torrey's Flora, "which being one of the *latest* publications, is more likely to be correct. The discoveries of new species, and the establishment of new genera, nearly allied to *Apocynum*, may from time to time, cause slight alterations in its character, according as new species are added, or old species are separated into other genera."—*(Letter from his highly esteemed friend, D. Thomas, to the author.)*

subulate, about as long as the tube of the corolla. *Corolla* small, campanulate, green; border erect. *Follicles* long, very slender.

A. pubescens. Stem erect; leaves ovate, hoary pubescent beneath; cymes pubescent; corolla longer than the calyx; border erect. OBSERVATION. Stem 2 to 3 feet high, with a few erect branches. *Leaves* on short villous petioles, obtuse, but not cordate at the base, mucronate, more or less pubescent beneath. *Cymes* short. *Flowers* few, (small.) Segments of the *calyx* lanceolate. *Corolla* greenish-white.—*Torrey's Flora.*

A. cannabinum. Stem erect and branching; leaves oblong-oval, hoary beneath, and downy when young, (more or less glabrous in maturity;) cymes lateral and terminal; pubescent when young, (more or less glabrous in maturity;) tube of the corolla about equal to the calyx, with an erect limb.—*Eaton's Manual.*

Apocynum cannabinum is easily distinguished from *A. androsemifolium* by the much larger flower of the latter; and from *A. hypericifolium* by the somewhat procumbent stem of the last, and by its having "very much the aspect of hypericum."—Vide *Barton's Compend. Flor. Philadel.*

Description.—The roots of this plant are perennial, and creeping, the stems are brown, and about two feet high, the leaves smooth, in pairs; it abounds in a milky juice. Towards the upper part of the stem the flowers come out from the wings of the leaves in small bunches; they are of an herbaceous white colour, and being small, make no great appearance. This therefore is seldom admitted into gardens except for the sake of variety.* It flowers from July to September, and is a native of Virginia and Canada. It is propagated by parting the roots in March, before they put out new stems. It is hardy enough to thrive in the open ground, but the soil should be light and dry, otherwise the roots are apt to rot in winter. This sort spreads so much by its creeping roots as to be troublesome in gardens. The stems decay to the root in autumn, seldom ripening their seeds.† The bark of the stem when dry is very fibrous, and may be peeled off in strings, which are very tough and strong. The Indians of North America prepare the stalks of this species as we do hemp, and make twine, bags, fishing nets, and lines, and linen for their own wear.‡ It was cultivated by the Dutchess of Beaufort in 1699. One species of this plant, the *A. juventas*, renovating dog's bane, is esteemed by the Chinese for possessing similar properties to those of the ginseng.§

The root of the species under consideration, which is the only part of the plant employed in medicine, belongs to the class Radix repens,

* The *androsemifolium*, whose flower is larger, and of a purple colour, is more cultivated for appearance.

† Miller's Gard. Dict. London, 1798. ‡ Vide Kalm. § Rees' Cyclop.

and is frequently very tortuous. It consists of two distinct portions, the main body of the root covered with a bark. The ligneous portion is of a yellowish-white colour, possessing considerable bitter taste, and some odour. The cortical part is of a brown colour, and rough externally, white, and smooth within. Its taste is extremely bitter, rather nauseous, and somewhat similar to that of the *Sanguinaria canadensis*. Odour strong, and unpleasant.

Chemical properties.—Organic chemistry has hitherto been but partially pursued as a distinct science; its votaries have been comparatively few, and the facts which have been made known are still very much isolated and scattered. But the multiplied discoveries which have been made, and the numerous, interesting, and important circumstances relative to this class of bodies which have been given to the world, induce us to believe that this branch of analytical investigation will ere long advance to the rank of a distinct science, and claim a large share of attention. In the mean time, he who, by experiment and research, shall add one fact to the accumulated series, will furnish an additional stone for the erection of this new edifice, and lighten the task of him who shall undertake its construction.

The chemical investigation of this root has been pretty fully entered into, in order to ascertain its proximate principles. With this view numerous experiments were instituted, more than it would be adviseable to embody here. In some instances the results obtained by the use of reägents, were somewhat doubtful as to their nature; in such case I have drawn the most correct conclusions I was able, considering the limited state of our knowledge in this department of chemistry.

Experiment 1st.—Two hundred grains of the dried root were boiled one hour in eight ounces of water till reduced to six and a half ounces. The decoction was of a bright brownish-red colour, having a strong and somewhat nauseous odour, and a very bitter taste, resembling very much those of the dry root. The addition of a few drops of a solution of sul. ferri. to a portion of it, changed its colour to a dark green. The primitive colour was restored by sulph. acid. A portion of the decoction was treated with the acet. plumb. in solution, which caused the immediate precipitation of a light brown, flocculent matter, in considerable quantity, leaving the supernatant liquor perfectly clear and transparent.

Experiment 2d.—One drachm of the fresh dried root was subjected to the action of three ounces of alcohol, also one drachm to three ounces of water. The tincture was of a very light brown colour, and possessed very little bitterness. The infusion was much darker and much more bitter.

Experiment 3d.—The addition of water to the tincture rendered it of a turbid, opaque whiteness, destroying its original colour. Sol. sulph. ferri., caused a

light green colour. When added to the infusion it became of a turbid green colour.

Experiment 4th.—Forty grains of the ligneous part of the root were macerated in two ounces of water for forty-two hours; the infusion was slightly tinged with yellow, apparently containing a good deal of mucilage. An equal quantity of the cortical part of the root was treated with the same quantity of water for the same length of time. This was of a bright brownish-red colour, similar to Madeira wine. On the *first*, sulph. ferri. had but a partial effect, causing a very slight tinge of green. Acet. plumb. had only a slight effect; it threw a little precipitate. On the *second*, sulph. ferri. had a decided effect, causing a dark green precipitate as in the former experiments. Acet. plumb. precipitated the same dark brown substance before noticed, in considerable quantity, leaving the liquor clear and transparent. From the latter, a white caseous precipitate was separated by the aqueous solution of gallic acid. A solution of carb. pot. had no effect on either infusions. The precipitate of the second from the sulph. iron. being filtered off, the remaining liquor was changed to a beautiful violet colour by the gallic acid.

Experiment 5th.—Eighty grains of the dried root were macerated in two ounces of water forty-eight hours, and the infusion evaporated to dryness. The residue was of a fine brown colour, and of a tenacious consistence.

Experiment 6th.—Two-hundred grains of the dried root were put into ℥xij. of distilled water; immediately after the immersion, the transparency of the fluid was lost, and it assumed a dull cloudy appearance, probably owing to the abundance of mucilage contained in the plant. At the end of twenty-four hours the liquor was of a clear amber colour, transparent. Neither the tinc. gallæ, tinct. iodine, oxal. ammon. or mur. barytes, had any effect on it. Eight ounces of the fluid were evaporated at steam heat. The residue was of a reddish-brown colour, thick in consistence, gummy. It could not be dried at this heat. Its taste was bitter, though differing somewhat from the solution before evaporation.

Experiment 7th.—The residual matter of the preceding experiment, was treated with distilled water; all the brown part was immediately dissolved, but a white scaly substance in considerable quantity remained undissolved. This was soluble in alcohol.

Experiment 8th.—The root remaining from the sixth experiment was then treated with alcohol. The addition of water to a portion of it caused a precipitate in the form of a white cloud. The rest of the tincture was evaporated, and a white substance was left which was insoluble in water.

Experiment 9th.—Twelve ounces of boiling water were poured upon two-hundred grains of the sliced root. The water immediately became cloudy, soon assumed a yellowish tint, and at the end of twenty-four hours was of a clear amber colour. At this time, at the bottom of the liquid, resting on the root, was observed a layer of a substance of a white woolly appearance, doubtless the mucilage of the plant, which was dissolved by the hot water, and precipitated when cold. Sulph. ferri. produced a slight green tinge, and acet. plumb. its before mentioned precipitate.

Experiment 10th.—When the aqueous infusion was treated with a solution of nit. of mercury, a dirty-white precipitate was formed, leaving the liquor above limpid, which in twenty-four hours, had assumed a purple colour. A solution

of chlorine being added, this colour was destroyed, and a white precipitate thrown down. Lime water added to a part of this, caused a yellow colour, which immediately changed to black. When the precipitate was washed with water, before adding the lime water, no yellowness was produced.

Experiment 11*th.*—One hundred and fifty grains of the dried root were macerated in successive portions of alcohol, until all the matter soluble in this menstruum without heat was taken up. The remainder of the root was then dried, and was found to have lost from forty to fifty grains, equal to about twenty-nine per cent. The alcoholic solution was of a bright yellow colour, possessing much bitterness.

Experiment 12*th.*—This was distilled in a glass alembic until two-thirds had gone over. The remaining fluid was then of a rather deeper yellow, intensely bitter, and containing a yellow, powdery looking substance in small quantity. This concentrated tincture was then placed over steam in a glass vessel, and evaporated nearly to dryness. Soon after the evaporation had commenced, there began to form a thick viscid substance of a yellowish-brown colour, and a bitter taste, sufficiently acrid to blister the tongue in a few seconds. This substance appeared in considerable quantity. There was also observed a greasy looking substance, floating on the fluid, not so abundant as the preceding, but evidently differing from it.

Experiment 13*th.*—Five-hundred grains of the root were covered with alcohol and allowed to macerate; which operation was repeated four successive times. The last time very little colour or taste was perceptible in the tincture. The united tinctures were distilled until about two-thirds had passed over, (a small portion being retained, which was changed to a milky-whiteness when diluted with water, depositing in a few hours a white powdery precipitate.)

Experiment 14*th.*—The residuum in the alembic was placed over a steam bath, and about one-third evaporated, and then cooled. The edge of the fluid at the dish was covered with a *white, greasy looking substance*, very much resembling *tallow*, which extended in a thin coating up the sides of the glass. The bottom of the dish was also copiously dotted with a substance of apparently similar nature, but formed in distinct and separate globules, about the size of a large pin's head. They were entirely loose upon the glass, and a few of them uniting, *floated* on the liquor. The fluid was drawn off into another vessel, and this adipose substance left over the bath to dry, but as the globules soon began to assume a yellow colour from the heat, they were removed and allowed to dry spontaneously.

Experiment 15*th.*—The tincture was further evaporated, and when about one-half of it had disappeared, and the rest cooled, a considerable number of the brown, greasy looking globules, before mentioned, (Expt. 12th,) were observed, floating on, and dispersed through the fluid.

Experiment 16*th.*—The white substance, upon examination, presented the following characteristics. It had no odour, but possessed the peculiar nauseous, bitter taste of the plant in a very strong degree, and had an unctuous feel in the mouth, as well as between the fingers. It was insoluble in sulphuric acid, either dilute or concentrated, hot or cold, though blackened by it when concentrated. Acetic acid did not dissolve it. Potash water, nor aq. ammon. had

any effect on it. Ether dissolved it readily; alcohol slowly, but completely. It was insoluble in water.

Experiment 17*th.*—The yellow or brownish, and greasy looking substance, which always appeared after the other in evaporating a tincture of the root, appeared to contain all the colouring matter capable of being extracted by the alcohol. This was so bitter, that when a piece not larger than a pin's head was held a short time in the mouth, it blistered the tongue severely, and the bitter taste remained several hours, affecting the tongue and fauces very disagreeably. It dissolves completely in alcohol, though slowly, and communicates to it a beautiful amber tint. It is insoluble in water, but after remaining in it a few hours, it loses its characteristic colour, and becomes of a dirty-white; it is also rendered very pulverulent, where, as before, it was very adhesive.

Experiment 18*th.*—Two ounces of the root were boiled in twenty ounces of distilled water one hour, then allowed to cool, decanted, and a fresh portion added, and boiled half an hour; this was decanted, and more water added. This operation was repeated until the water remained tasteless and colourless. The different decoctions being added together, were filtered; the colour was like that of Madeira wine. When tested with a solution of sulph. ferri. no change was produced until the fluid was concentrated, when it assumed a black colour, and threw down a slight precipitate. The tinct. of iodine produced a dark purple hue, showing the presence of *fecula.* A solution of nit. of silver caused a yellowish precipitate, showing the presence of *gum,* or *bitter principle.* Solution of acet. of lead produced a yellowish-white precipitate. The decoction affects litmus paper, showing the presence of an uncombined acid. A solution of gelatine proved the presence of *tannin.* The decoction was evaporated nearly to dryness, and treated with alcohol, which separated a portion of gum. This tincture was filtered, and evaporated nearly to dryness. The result was a dark reddish mass, which tasted at first sweet, but soon became intensely bitter, producing a swollen sensation of the lips and tongue.

Experiment 19*th.*—One ounce of the sliced root was boiled in ten ounces of alcohol fifteen minutes, and then macerated ten days. The alcohol when filtered, had the appearance of Madeira wine, and was very bitter. About one-third was evaporated, and on cooling, a substance like wax was deposited, which was removed, and two ounces of distilled water added, which separated a quantity of *resin.* This was removed, and the evaporation was continued until it had the consistence of thick syrup. The taste of this was at first sweetish, soon becoming very bitter, and occasioning a swollen sensation of the lips and tongue.

Experiment 20*th.*—The root after being treated with alcohol, was dried, boiled half an hour in twelve ounces of distilled water, and then allowed to macerate three days. The water was then decanted, a fresh portion added, and boiled three-quarters of an hour, when it presented a greasy appearance, which on cooling was found to be caused by wax. It was then filtered, evaporated to the consistence of a thick syrup, treated with alcohol, which separated a quantity of gum, again filtered and evaporated nearly to dryness. The result was the same as in Expt. 19th, but in a lesser degree.

Experiment 21*st.*—The root, after being treated with successive portions of alcohol and water, until the bitterness was dissolved, was macerated one week

in six ounces of ether. It was then filtered and four ounces distilled off, when the remainder became turbid; this on cooling deposited a copious, yellowish-white precipitate, which had the appearance and feel of wax. This, when heated, melts, swells, takes fires, and burns with a white flame, leaving a very small portion of charcoal. The remainder of the ether was distilled, and left a very small quantity of resin, which was not bitter.

Experiment 22d.—Two ounces of the sliced root were macerated in repeated portions of distilled water until it came off colourless and insipid. The several portions were united, filtered and evaporated nearly to dryness; the extract being dark-coloured, very bitter, and viscid, weighing two hundred grains. This was macerated in successive portions of alcohol as long as it dissolved any of it. The residue was a spongy mass, insipid, possessing all the properties of gum. The alcohol was then boiled with eighty grains of calcined magnesia, filtered and evaporated to dryness. The result was a dark, reddish-brown mass, brittle, very bitter, nauseous and deliquescent. This may be considered as the pure *bitter principle*, coloured, as it is affected only by sub. acet. plumb. and nit. argent. which require twelve hours to show any change.

Observations.—The *first* experiment shows the action of two of the most active reägents which were employed.

By the *second* we have very clearly proved the superior power of water over alcohol in extracting the colouring and bitter materials of the root.

The object of the *fourth* experiment was to ascertain which part of the root contained the greatest quantity of active matter. The *cortical* part, it will be observed, contains by far the larger quantity.

It is shown by the *fifth* that much of its virtues is imparted even to cold water.

Experiments *third*, *seventh* and *eighth*, prove the existence of a resinous substance, and that a considerable quantity of matter which cold water does not dissolve, is soluble in alcohol.

From these experiments we may finally conclude that this root consists of—1, tannin; 2, an acid, probably the gallic; 3, gum; 4, resin; 5, wax; 6, fecula; 7, bitter principle, or *apocynin;* 8, colouring matter; 9, woody fibre; and though I have not been able to prove its existence satisfactorily in the dry root, in the laboratory, I very strongly suspect that the fresh root and the juices of the plant contain a considerable quantity of—10, caoutchouc.

Medical properties.—The medical qualities of this plant must be deemed of the most important kind. I was led to the examination* from hearing it spoken of in very favourable terms by a medical gentleman of established reputation of New York, who declared it to be

* My attention was first directed to this article as the subject of an inaugural essay.

one of the most valuable remedies in dropsy he had ever employed. A careful inquiry into the correctness of this remark has led me to adopt the same conclusions, and the cases which I have detailed will prove to the reader that its efficacy as a remedy has not been misjudged.

I have before observed that it is somewhat surprising that a plant possessing such well-marked and energetic, as well as varied properties, and which grows in such abundance in the United States, should not before have been noticed by physicians generally. There are a few, however, who have employed it in their practice with the most decided benefit, and even with extraordinary effect. In some cases its benefits have been more partial, but in none that have come to my knowledge, where it has had a fair trial, has it been entirely inert. It has been used for some years past in country places, amongst those not connected with the profession, with whom it seems to have obtained a full share of the credit which it merits.

In 1831, there appeared in New York a small pamphlet purporting to be a translation of a paper read before the Royal Academy of Sciences, containing the botanical description, chemical analysis, and exposition of the medical properties of a plant of South America, called the Kahinça, (*Chiococca racemosa anguifuga*, flore luteo,) by MM. Francois, Pelletier and Caventou. Between this vegetable, and that forming the subject of this thesis, there is a remarkable analogy, and were it not for the difference of the botanical characters, we might readily suppose them to be merely varieties of the same species. They are used in the same disease, and produce nearly the same effects. The *Apocynum cannabinum* bears also a close analogy to the common milk weed, (Asclepias.) Several cases related in Paris' Pharmacologia by Andrew Hammersley, go far to prove the similarity of their medicinal virtues.

This medicine has been administered in the various forms of tincture, powder, pill, and decoction. From the unpleasant effects produced upon the stomach of some patients, by the latter mode of exhibition, the other methods were resorted to, in the hope of producing the same ultimate effect in a more agreeable manner. But it was found after various trials, that their operation was by no means so effectual, and they were abandoned, the form of decoction being retained as the only method by which the qualities of the plant can be efficiently administered. By this method all the properties of the root which are of any use in medicine appear to be fully extracted, and the results of some of the chemical experiments will show to how much greater extent they are imparted to water than to alcohol.

The formula for preparing the decoction will be given in another place.

The Indian hemp when taken internally appears to have four different and distinct operations upon the system:—1st. As an emetic. 2d. As a purgative. 3d. As a sudorific. 4th. As a diuretic.* Each of these effects it produces almost invariably. Its first operation when taken into the stomach is that of producing nausea, if given in sufficient quantity, (which need not be large,) and if this is increased, vomiting will be the result. It very soon evinces its action upon the peristaltic motions of the prima viæ, by producing copious feculent and watery discharges, particularly the latter, which action, when once excited, is very easily continued by the occasional administration of a wine-glassful of the decoction. The next operation of this remedy is upon the skin, where it displays its sudorific properties often in a very remarkable manner. Copious perspiration almost invariably follows its exhibition, to which effect is, in a great measure, attributed by some, the powerful influence it exercises over the various forms of dropsy. The activity of its diuretic properties does not appear to be so great in many instances as in others. In the first three or four cases related, the urinary secretion, although somewhat increased in quantity, was not such as to be commensurate with the effect produced upon the disease by the exhibition of the medicine. In other instances its diuretic operation has been more manifest, causing very profuse discharges of urine, and in a very short time relieving the overloaded tissues of their burden.

Dropsy is, I believe, the only morbid affection for the relief of which the powers of this plant have been brought into successful requisition. Its very active, and often violent operation, would seem, in a great measure, to preclude its use in diseases which are accompanied with much febrile excitement. Yet one might readily suppose that some of its particular properties might be very advantageously sought for in some diseases where much arterial excitement was not present—especially its emetic, sudorific, or cathartic properties, each of which operations might probably be separately obtained by giving it in well regulated doses.

Upon the discussion of that interesting question, whether the power of hydragogue medicines depends upon their agency in increasing the

* As a *sternutatory* also it has a very powerful effect, as I have experienced in my own case; the fumes, on one occasion, produced, not only long-continued and violent sneezing, with an increased discharge from the Schneiderian membrane, but were unquestionably the exciting cause of an attack of erysipelas of the face and head.

action of the absorbent system of vessels, or of diminishing that of the exhalants, or both, it is not my purpose here to enter; but I may say, that the experiments of a talented and ingenious professional individual of Philadelphia, JOHN K. MITCHELL, M. D. lately given to the public in a paper "on the Penetrativeness of Fluids," would seem to throw a new light upon the question, and lead us to believe that *percolation* through the membranous parietes of the cavities containing the fluid of dropsy, promoted in some manner by the operation of diuretics and hydragogue cathartics, is one means of the ready removal of the liquor.

Without further remark or comment upon the plant under consideration, I shall now proceed to relate a few cases, kindly furnished me by some of my medical friends, in which the efficacy of the remedy is most fully proved, and its inestimable virtues placed in their proper light.

CASE I.—"A. B. aged sixty-eight, of temperate habits, was affected after exposure to cold, and fatigue, with difficulty of breathing, particularly when lying in bed, or going up stairs, with a feeling of great weariness and fatigue. Being of a plethoric make, and full habit, he was bled with a view to relieve these symptoms. Some benefit followed the loss of blood in the shortness of breath in particular. The lower extremities began soon to become œdematous, and there was also an evident deposition of water in the cavity of the peritoneum as evinced by fluctuation. All his hydropic symptoms continuing to increase, after free depletion from the blood-vessels, bowels, and kidneys had been practised by bleeding, purging, and diuretics, he was put upon a decoction of the Apocynum cannabinum, and in the course of two days it produced considerable nausea, with occasional vomiting. This was followed by an active cathartic action on the bowels, accompanied with profuse perspiration. All other medicines were now suspended to witness the action of the apocynum singly. Some diuretic effect also accompanied the first action of the medicine—but this was far from being its first or peculiar action. The effects of it upon the skin, stomach, and bowels were readily kept up by a small quantity of the medicine occasionally administered. All the dropsical symptoms soon began to abate, and in a short time he was freed from this aqueous deposit. To keep up its action, he took from time to time a wine-glassful of the decoction, made by *boiling two drachms of the root in three pints of water, to two.* In a few days he could only bear two or three wine-glassfuls in the course of the day. To promote a discharge from his bowels, he would have recourse during convalescence to one or two

wine-glassfuls, whenever the state of his bowels might require. He took it also in pills, in the quantity of three or four grains of the powdered root, three times a day. The distressing sickness the pills occasioned, caused them to be discontinued. They did not produce the same beneficial effect upon the bowels and skin, as the decoction."

In this case we have the therapeutic operations of this medicine very clearly instanced; first its action upon the stomach, producing nausea and vomiting, followed by an active cathartic operation, and this succeeded by a very active diaphoretic action, with but a partial effect upon the urinary organs.

Case II.—"Mrs——, ætat. 58, of a full and plethoric habit, has, since the cessation of the catamenia, been subject to congestive attacks of the brain, and has twice been affected with paralytic seizures of the hemiplegic character. To relieve the general and local plethora, repeated venesections have been resorted to from time to time. They have been followed by the happiest effects; but from the crowded state of the large vessels about the heart and general fulness of the system, serous effusions have taken place into the pleura, pericardium, peritoneum, and cellular tissue generally. In this case I have witnessed the happiest effects from the use of the Apocynum cannabinum. The hydropic symptoms have several times been removed by this medicine. Its beneficial operation seems to depend mostly upon the effect it exerts upon the stomach, bowels and skin, and when this effect passes by, the action of it upon the kidneys denotes that it has also that determination."

Case III.—C. D. ætat. 66, of rather a spare habit, has been accustomed to much activity of body and mind, and from occupation has been in the habit of living luxuriously. From time to time for several years past, a frequent dry cough, with shortness of breath in walking fast, and on ascending a flight of stairs, particularly began to denote, that probably some serous deposit was going on in the pleura. This was ultimately confirmed by difficulty of lying down, with œdema of the feet and ankles.

After the usual depletory treatment, which never failed to relieve the symptoms in the early period of the disease, he at length found upon trying the apocynum, that it exercised a complete controul over the disease; and he for a long time used it exclusively in the treatment of his disorder. Such was the confidence he reposed in it, that he cultivated a considerable quantity in his garden for his own wants and the benefit of others. His physical powers, after repeated attacks, were unable to bear up against the disease, and he sunk exhausted and died.

Case IV.—"E. F. ætat. 4 years, had for some time laboured under the most unequivocal evidences of a deposit of water in the ventricles of the brain. Other means being exhausted, the apocynum was had recourse to, and the strength of the child being adequate to the violent action of this medicine, particularly upon the stomach and bowels, and considerably upon the kidneys, the hydrocephalic symptoms gradually yielded, and the child recovered perfectly."

After detailing the foregoing cases, the narrator of them remarks, "from what I have observed of the operation of the Indian hemp, more of its remedial effects are to be ascribed to its action upon the stomach, bowels and skin, than upon the urinary organs. It is in my opinion a valuable addition to the articles of the materia medica, which are derived from the vegetable kingdom."

The particulars of a case, of which the following is a summary, was obligingly furnished me by a professional friend at New York, who had the patient under his care during the trial of the apocynum.

Case V.—The patient was a large, athletic Englishman, of sanguine temperament, aged about fifty years, by profession a cook, and had always enjoyed excellent health until within a few months, when he was attacked with inflammatory affections of his chest and liver, for which he was treated in Washington, D. C. by large depletions, mercurials, &c. His general health appears to have received from this attack, a shock from which it never recovered. When my friend saw him first, in New York, "he was found seated in an arm chair, leaning across the back of a small chair, pallid, breathing with great difficulty, scarcely able to answer the questions put to him, being under such general oppression and debility, with effusion of the chest and abdomen, and general anasarca. He had not been able to lie in bed for upwards of three weeks. He complained of no pain, with the exception of a slight uneasiness of the right hypochondrium, where the liver was evidently enlarged. His pulse was slow and intermittent. He was immediately put upon the use of the Indian hemp, which was continued in this rather hopeless case for three weeks, without any other internal remedial means; after which period he was enabled to return to his usual employment, and actually cooked a dinner for thirty persons, almost without aid. The formula employed in this case was somewhat different from that before mentioned, and was as follows:—℞. Rad. apocyn. cannab. contus., bacc. junip. āa. ℥j.; aqua font. Oiij. S. *Decoque leni igne ad octantes duos, cola, et adde,* Spiritus junip. ℥iv.

"The gin is added for the purpose of preventing its spoiling.

"Of this he took a wine-glassful three times a day, diminishing the quantity if it purged or vomited him too much. Its diuretic qualities did not appear until the second or third day, when it seemed no longer to affect his stomach, but acted very powerfully on his kidneys. He obtained almost immediate relief however, and was able to lie down in bed, and in any position, before the swellings of his hands and feet had subsided, which, for the last few days were kept constantly bandaged. The patient some time afterward died very suddenly, probably from a rupture of his heart, but an examination could not be obtained."

In this interesting case, we find that the remedy had a much greater effect upon the kidneys, than in those before related, and that more benefit is attributed to its operation on these organs than upon any other. Its action upon them appears to have been very powerful. This may, doubtless, in some measure, be ascribed to the additional ingredients in the formula, which are both somewhat diuretic in their operation, but perhaps more to its superior strength. Two drachms only of the root were employed in the cases first given, whereas one ounce was used in this case with the same quantity of water. The effect upon the cutaneous surface does not appear to have been noticed.*

* Since this essay was written, I have had the pleasure of witnessing another case of entire removal of very extensive dropsical effusions, which occurred during the last summer in the New York Hospital, under my own care, while resident physician of that charity. The patient was a young coloured man, who, when he entered the house, was totally unable to lie down, from the difficulty of respiring in that posture; his articulation was very much impeded; he had immense fluctuating distentions of his abdomen and scrotum, and very large swellings of all his extremities. He was at first put upon the use of the ordinary hydragogue medicines of the house, which course, together with puncturing the scrotum and penis, in a few days gave him some relief, but of short duration, A trial of the properties of the Indian hemp was then made, which resulted in a short time in the complete removal of the adventitious deposit, so that the dyspnœa disappeared, his utterance became unembarrassed, and his belly and limbs resumed their wonted dimensions. The primary effects of the medicine upon his stomach were very distressing, producing such disagreeable nausea and vomiting, that it was found necessary to diminish the dose; but he soon became able to bear its exhibition in the ordinary quantity, particularly when combined with some grateful aromatic. The patient did not live long to enjoy his renewed state of health, but died shortly after, of an attack of apoplexy, though he had been copiously depleted during his illness.

The following letter from Professor Renwick, contains strong evidence of its efficiency:—

"Dear Sir,

"In compliance with my promise, I have to communicate to you the circumstances of the case of a child of mine of dropsy in the head, by the use of the Indian hemp, *(Apocynum cannabinum.)* Not having taken memoranda at the time, I am compelled to trust to memory for the facts.

"The child is a girl, and was then about sixteen months old. After about ten days of sickness, the disease, which had at first been treated as an inflammation probably of the chest, but which had, after the second day, been suspected to be an affection of the head, manifested itself clearly as the latter, with all its most decided symptoms. The sutures of the head were opened; the forehead projecting considerably; the sight of one eye was totally lost, the other retained but little sensibility in the short intervals of stupor rather than sleep, in which she lay. A constant involuntary motion of one arm and leg remained for thirty-six hours. The night preceding the exhibition of the medicine, I had lain down in my clothes in the room, and was called up to see her expire, as the attendants conceived life was nearly extinct. A partial revival however took place, without any lessening of the symptoms. The only treatment used by the attending physician at this time, was the administration of a mixture of rhubarb, magnesia, and aniseed water, and the application of a blister to each temple. By the action of the medicine the discharge from the bowels was kept up, but the urinary functions had ceased altogether for more than twenty-four hours. The physician saw the child about ten in the morning, and while he intimated that the means he had indicated should be persevered in, expressed no hope, and assented forthwith to my request that the Indian hemp should be administered. It was 12 o'clock before it could be procured. It was then prepared by dropping pieces into a coffee-cup until it was nearly full, covering it with water, and stewing it by the side of the fire for about an hour; of this half a tea-spoonful was given every hour, commencing at about 2 o'clock. The physician called about an hour after; the unfavourable symptoms had by this time so far increased, that he informed me the child must die during the night, and probably at the return of the hour at which the crisis had appeared to take place the preceding night. At ten the next morning, he repeated his visit without any hope of finding his patient alive. But by this time, under the constant exhibition of the medicine, a marked change had occurred. The urinary organs had been restored to natural action; the sight of both eyes was perfect; the blisters that had not even caused a redness of the skin, had risen and given a copious discharge. The stupor and insensibility which had permitted the nauseous medicine to be given without difficulty, had passed away, and its administration was forcibly resisted. The quantity was diminished in the course of the day to less than one-half, and the favourable indications continuing, the child was on the next pronounced in a fair way of recovery. The hemp was given for about a fortnight, diminishing the dose gradually until it fell to half a tea-spoonful of the strong decoction in twenty-four hours.

"About a month afterwards, symptoms appeared that seemed to threaten a

relapse; on this occasion the Indian hemp was directed by the physician, and they speedily abated."

Columbia College, New York, December 3d, 1832.

There has now been adduced, I think, sufficient evidence to prove that this remedy is entitled to a considerable share of attention from the medical public, and that it is worthy of a distinguished place among the articles of the materia medica. Were it necessary to bring together multiplied proofs of its efficiency, this might easily be done, but I think enough has been said to justify its extensive introduction into medical practice.

I trust that this invaluable plant will be rescued from its unmerited obscurity, and become the means of preserving to the world many valuable lives; or, at least, of meliorating in numerous cases, the excruciating tortures attendant upon some of the protean forms of dropsy, and of smoothing the path "to that bourne whence no traveller returns."*

New York, December, 1832.

ART. III. *Remarks on the Euphorbia corollata.* By WILLIAM ZOLLICKOFFER, M. D., F. C. P. &c. &c.

TO such as are desirous of becoming acquainted with the remedial virtues and consecutive therapeutic operation of the vegetable productions which are indigenous to the United States, it is presumed no apology is necessary for my again intruding on the medical community, with another communication that ranges within the limits of

* It was not until after this dissertation was written, that the existence of a paper on this subject, published by Dr. M. L. Knapp, in 1826, in a No. of the "American Medical Review and Journal," came to my knowledge. Before this, I was not aware that I had been preceded in the investigation of the properties of the Indian hemp. Although the results of, or rather the inferences deduced from some of the experiments performed by each of us, do not entirely agree, I can bear my testimony to the general accuracy with which that paper is drawn up.

Dr. Knapp appears to have administered this remedy in some other diseases with considerable benefit. When the powdered root was given in doses of grs. xv. it operated as a salutary emetic, in his own person, as well as upon others; being closely allied in this respect to ipecacuanha, for which medicament, he sometimes substituted it. It had the effect also of greatly lessening the frequency of his pulse. As an alterative, and expectorant likewise, he gave it in doses of gr. ss. to gr. ij.

the medico-botanical literature of this country; and to those who entertain the sentiment, that the list of our native medicinal agents is at present sufficiently enlarged to effect all that can be accomplished by physical powers; and who presume, that our knowledge upon this subject has attained its ultimate point of improvement, and consequently display no interest in the subject of its ultimate furtherance, the opinion of a distinguished correspondent would seem to be peculiarly appropriate, in avowing that, "from minds capable of adopting such a sentiment science can receive no impulse, and human intelligence no especial illustration."

The Euphorbia corollata first attracted my attention in the year 1819; and in the spring of 1821, I transmitted several of its recent roots to Professor BIGELOW, who transplanted them in the Botanic garden, and in his American Botany he has described and figured the plant.

The Genus Euphorbia was placed by LINNÆUS in the class *Dodecandria*, and the order *Trigynia*. MICHAUX has transferred this genus to *Monœcia, Monadelphia*. It belongs to the natural orders of *Tricoccæ* of LINNÆUS, and *Euphorbiæ* of JUSSIEU.

GENERIC CHARACTER.—The flowers of the Genus Euphorbia are characterized by a *calyciform involucrum* with *four* or *five segments* like *petals*, and the same number of *interior segments* like *nectaries*. *Stamens* twelve or more. *Filaments articulated*. Fertile flower *solitary, stipitate, naked*. *Styles three, bifid*. *Capsule three-seeded*.

SPECIFIC CHARACTER.—The species Corollata is distinguished from all of the other individuals belonging to this extensive genus by its *five-rayed umbel*, which is *three-parted* and *dichotomous*. The *leaves* and *involucra* are *oblong* and *obtuse*. The *segments* of the *calyx* are *obovate, petaloid*, and *coloured*.

Professor Bigelow has given the following excellent description of this plant. He says it—

"Has a large branching root, which sends up a number of stems, frequently from two to five feet in height. They are erect, round, and in most instances simple. The leaves are scattered, sessile, oblong, obovate or linear, a little revolute at the margin, smooth in some plants, very hairy in others. The stem divides at the top into a large, fine-rayed umbel, supported by an involucrum of as many leaves. Not unfrequently a small axillary branch or two arise from the sides of the stem below the umbel. The rays of the umbel are repeatedly trifid or dichotomous, each fork being attended by two leafets and a flower. The top of the stem or centre of the umbel is turgid, and often bears a precocious flower. The calyx is large, rotate, white, with fine obtuse petal-like segments, from which the name of the species has been taken. The nectaries or inner segments are fine, very small, obtuse projections, situated at the base of

the segments. Stamens a dozen or more emerging, two or three at a time with double anthers. Germ pedicelled. Capsule three-celled."

The Euphorbia corollata is a very common plant in some parts of Virginia and Pennsylvania. In some districts of Maryland, and more particularly in Anne Arundel county, it grows in the greatest abundance, where it is recognised by the common and local appellations of *milkweed*, *snake's-milk*, *ipecacuanha*, and *Indian* physic. It delights and flourishes in a poor, dry, and sandy soil. It is rarely discovered in the woods, but in fields which are cultivated every two or three years. The farmers in Anne Arundel county, where the fields are literally overrun with it, have frequently told me that the small grain sustains considerable injury from its rapid growth in the early part of the spring, checking the natural process and progress of vegetation in the grain, and that the ordinary means which are made use of, (such as ploughing and harrowing,) in order to kill bluegrass, have the effect of increasing the quantity and rapid growth of this plant. It is never eaten by animals. The stalks which arise from the common trunk of the root, are sometimes as many as thirty, and from this down to a single one. The largest roots that I recollect seeing, measured from an inch to two inches and a half in circumference.

Solubility.—Alcohol, wine, and water are the best menstrua for extracting its active qualities. The alcoholic and watery extracts are equally active. Two thousand one hundred and sixty grains of the recent root afforded one hundred and two grains of aqueous extract; and the same amount, by digesting in alcohol, gave one hundred and twenty-three grains of alcoholic extract.

Desirous of ascertaining the relative proportions of *epidermis*, *cortical*, and *ligneous* matter entering into the organization of the root of the Euphorbia corollata, I selected a portion of healthy root, which weighed 893 grains: on examination the *epidermis* weighed 84 grains, the *ligneous* or woody part 189, and the *cortex* or bark 620. From these results it seems that the root is made up of nearly two-thirds of the part in which its activity exclusively resides. The separation of these several parts of the root I effected with the greatest possible care.

Chemical composition.—I digested for seven days, ʒij. of the powdered root in ℥iij. of sulphuric ether; this was then passed through bibulous paper, which, on the addition of rectified alcohol, (carefully prepared by myself,) gave a precipitate. ʒis. of the root, which had been digested for the same period in ℥iij. of rectified alcohol, assumed on the addition of distilled water a lacteous turbidness.—ʒij. of the root which had been permitted to digest for four days in distilled

water, after being filtered, exhibited, on the addition of rectified alcohol, a turbid aspect. From these results the chemical composition of this root may be inferred to consist of caoutchouc, resin and mucous. This examination was made in imitation of that instituted by Professor Bigelow, and with effects produced by the concurrence of the same coöperating causes, perfectly analogous to those which were accomplished in his hands.

Incompatible substances.—Kino exhibited in combination with the corollata, interferes so much with its medicinal operation as to render it perfectly inert; while the kino itself undergoes such a change in its remedial powers, as a consequence of its consociation with the corollata, as entirely to alter the character upon which its astringency depends. Catechu produces the same effect, and the same interchange of reciprocal action occurs. From this circumstance I am led to the conclusion, that all astringent vegetable substances are at variance with the therapeutic operation of the corollata. In two instances I took twenty grains of the powdered root out of a phial, containing the article sufficiently active to excite *emesis*, in combination with six grains of powdered kino, and no sensible effect of the corollata was experienced, or did the kino display the least perceptible astringent operation in altering the period at which I usually have a dejection, that is, about half an hour after breakfast every morning. Nine grains of the catechu, with twenty-five of the corollata was attended with exactly consimilar results. Opium given in conjunction with it, interferes only with its emetic operation, and it should not therefore be given in combination when the object of the practitioner is to produce *emesis.* Acetic acid interrupted its ordinary operation in two instances, (and the only two cases in which I tried the experiment on myself,) by causing it to pass off by the bowels.

Pharmaceutic preparations.—The vin. Euphorbiæ corollatæ, and the pulvis corollatæ compositus. The former preparation I have made in the following way:—℞. Radicis Euphorbiæ corollatæ, ℥i.; vini albi hispanæ, octarius unus. dosis ʒii. ad ℥ss.; emesis provocandi. The latter formulæ is in imitation of the pulvis ipecacuanhæ compositus, and does not differ in the proportions, except in substituting the corollata in the place of the ipecacuanha. Both of these preparations are as prompt and effectual as remedial agents.

Medical uses.—This vegetable is emetic, diaphoretic, expectorant, and epistastic. As an emetic it is mild and certain in its operation, rarely occasioning pain or spasms, and exciting little previous nausea or giddiness; possessing an advantage over some other remedies of this class, that when it does not prove emetic, it passes off by the

bowels. The dose of the powdered root that is required to excite emesis, is from fifteen to twenty grains. This substance is better calculated to effect certain indications, than the more nauseating articles belonging to this class of remedies; and as the judicious practitioner, in the selection of an emetic, will always be guided by the nature of the indication which he intends to fulfil, if his object be to evacuate the stomach quickly and completely, he will avoid those emetics that are distinguished by their nauseating tendency, as in cases of disease which depend on a disordered state of the stomach, in connexion with undue distention, and the presence of acrid and indigestible matter: if, on the other hand, his intention be to influence some remote organ through the sympathetic powers of the stomach, an emetic of an opposite tendency may be better calculated to answer such indications, inasmuch as the nausea which they induce, greatly lessens the force of the circulation; and as the energy of absorption is generally in an increase ratio to that of the circulation, we frequently obtain from nauseating emetics considerable assistance in the treatment of different dropsical affections. The corollata is only calculated to effect the indications which are accomplished by the primary operation of emetics, for whenever our object is to evacuate the stomach, and prevent absorption, we must take care to cut short the nauseating stage, (by such articles as produces little or none of this effect,) a precaution which is highly important in the management of cases in which poisonous substances have been taken into the stomach. My object at present is not to discuss the operation of emetics and the diversified affections in which they are not unfrequently competent to the production of the most satisfactory results, for this to me would appear to be foreign to the contemplated intention I am desirous of fulfilling by the communication of this paper. What I have said is merely intended to show the applicability of this plant to particular cases. When it is administered with the view of procuring its diaphoretic operation, the quantity exhibited at each dose should not exceed four grains, and this proportion should be given every three hours. The pulvis corollatæ compositus may very frequently be used, particularly when a stimulant diaphoretic is indicated; for from the operation of this compound remedial agent, it would seem that whilst the opium increases the force of the circulation, the corollata relaxes the exhalant vessels, and consequently induces a copious diaphoresis. The action of each of these articles would appear to be mutually lost, and converted into a powerful diaphoretic, thus affording a very beautiful illustration of the combination of medicines which excite different actions on the stomach and

system, in consequence of which new or modified results are produced. The dose of this combination is the same of that of the Dover's powder. The expectorant operation of this plant may be procured in the dose of three grains, occasionally exhibited in a little honey, sugar and water, or any other suitable vehicle. In relation to its epispastic property, I would remark, that it possesses an advantage over the ointment prepared with the antimonium tartarizatum, in producing a beautiful display of pustules in twelve or fifteen hours after its application, which passes off in two or three days, without occasioning the least inconvenience whatever to the patient. The root in its recent state is merely to be applied contused to any part of the body, and permitted to remain a few minutes only, when a sufficient quantity of the lactescent matter will remain to produce the intended effect. A continuation of the pustular eruption may be kept up, by making an application of the contused root every forty-eight hours. It is the only vegetable substance that is entitled to attention on the account of the property it possesses of exciting an action on the surface in this way; and the only one that is calculated to answer the same purposes of the tartar emetic ointment.

ART. IV. *Personal Observations and Experience of Epidemic or Malignant Cholera in the City of Philadelphia.* By SAMUEL JACKSON, M. D. Assistant to the Professor of the Institutes and Practice of Medicine and Clinical Practice in the University of Pennsylvania. [With two plates.]

(Continued from Vol. XI. page 346.)

THIRD period, or incipient concentration.—The phenomena of this stage of the disease, are the mere exaggeration of those attached to the first periods; but there are superadded additional phenomena, the secondary effects or consequences of the persistance of the irritation developed in the alimentary mucous membrane, the disorders that state induces in important functions, and the evacuations or losses it occasions—effects that are generally connected with a particular state of predisposition arising out of the constitution, habits, previous diseases, age, or other individual circumstances, and the specific action, probably, of the epidemic principle.

In this period, as in the first and second, the leading phenomena proceed from the disordered condition *of the alimentary canal.* Vo-

miting, purging, and abdominal pains, to which are now combined almost invariably, excessive, unappeasible thirst, and appetence for cold drinks, are the most constant and urgent of the symptoms. The evacuations upwards and downwards are frequent, sometimes incessant, and are copious or excessive in quantity. The fluid now discharged is most generally thin, watery, having a very strong resemblance to rice or barley water; in some cases nearly as transparent as spring water; and most frequently after standing exhibits a flocculent precipitate with a supernatant clear fluid.

The amount of these evacuations is in some instances enormous, almost incredible. In hospital cases I have seen several gallons discharged in a few hours. In one case, during the third and fourth periods, in the space of five or six hours, three large bucketfuls were received from the stomach besides the evacuations from the bowels. Some of this quantity was doubtless the drinks taken, but the larger proportion was the animal fluid.

The evacuations upwards and downwards do not always correspond. Often they are opposed to each other. When the stomach is most affected, and the discharges upwards most copious, the lower intestines do not manifest as violent an irritation, and the dejections are often small in quantity; the reverse also prevails. When the greatest disorder is in the bowels, and the largest evacuations are from the intestines, the stomach is but little affected, and sometimes is entirely quiet, no vomiting taking place, or being speedily controlled.

The rapidity with which the patient passed through the stadia of the disease, and reached the period of exanimated collapse, corresponded, in my observations, most usually with the copiousness of the evacuations, and when these could be arrested, the case was proportionally prolonged. The apparent exceptions to this rule belong only to individual peculiarities. Persons excessively enfeebled by age, or by defective nutrition from long intemperance and chronic diseases, and whose sum of vital fluid and energy of vital force, are already diminished, sink very rapidly into collapse under evacuations and losses comparatively of small amount, yet which, relatively to themselves, are excessive.

In the *respiratory function* the symptoms in this stage generally assume a higher degree of intensity. The sentiment of oppression in the chest is often most distressing, the respiration is short and frequent—a feeling prevails as though the air was confined and close—an intense sense of suffocation I witnessed in several cases, the patients constantly demanded air, and desired to be placed in the open

atmosphere, complaining of the closeness and oppressiveness of the room, though of large dimensions. The temperature of the expired air in this stage fell below the natural standard, indicative of the diminished vitality of the lungs, and altered condition of their circulation and functions.

In the *circulatory functions* important modifications are present. The general circulation is diminishing and failing. The contractions of the heart are feeble, the pulse consequently small, and without force. A sentiment of great oppression and even anguish often is experienced in the heart—it feels full to bursting from the accumulation of blood in its cavities, and the incapacity of this organ to expel its contents. This feeling also is an innate sensation of the organ most generally attending the cessation of the general circulation. It announces this condition to the economy.

In the organic circulation or the movements of the sanguine fluid in the parenchyma of the organs, a profound change has taken place. In the exterior surface it is deficient and stagnant. The fingers and toes are discoloured, livid or blue. They are shrunken and shrivelled. The circulation as seen in the lips and gums is languid and stagnant. The blood can scarcely be expelled by the pressure of the finger, and it returns with slowness.

The *animal temperature* has fallen below the natural standard, following the diminished energy of the organic circulation. A sense of heat is, however, frequently experienced and complained of in the abdomen, particularly in those cases where the dejections are not very frequent and copious. The abdomen also is in most cases of a temperature higher than any other portion of the body. The thermometer placed under the tongue indicated 90°, 91°, 92° Fahr. the temperature of my patients in this stage. The tongue is cold to the touch.

The *cutaneous surface* now exhibits new phenomena. In the extremities, as already remarked, it is affected in its colour; is shrivelled and inelastic. In this period an exhalation, exudation, or transudation, of a clear, inodorous, watery fluid, is abundantly poured forth from the whole exterior surface. It forms in drops, rolls down in streams, and collects in small pools in the depressions above the clavicles, sternum, and other positions of the body. The clothing of the patient, and even the sheets are saturated. The skin has a cold, soaked, and lifeless feel when touched. In the face the same shrinking and shrivelling of the skin and subcutaneous cellular tissue has taken place as in the extremities, rendering the firm and bony pro-

minences more projecting, and causing the eyeballs to be deeply sunken in their orbits. The skin of the neck presents the same shrivelled condition, and if pinched up does not immediately retract. The appearance and the effects of extreme caducity, is in this manner rapidly induced, and proceeds from the same cause—the exhaustion and diminution of the fluid elements of the organism. In the one case, a slow and natural alteration, the work of time—the other, the rapid result of disease.

The *symptoms* proceeding from the disturbances of the *nervous system*, in this period, present an augmented, and, in many cases, acquire their greatest intensity. The muscles of the thighs and legs were often, from their rigidity, firm as solid bodies, or were contracted and knotted by the severity of the cramps. The muscles of the upper extremities, though they did not always escape, yet in no instance were as violently affected as those of the lower. In many cases intense neuralgic pains tortured the patient, the commotion of the nervous system falling on the organs of sensibility, while those of locomotility were either quiescent, or but partially disturbed. In a majority of the hospital cases, the sensibility appeared morbidly acute. Sinapisms and other painful remedies could be borne for a few minutes only. In four or five instances in the complete collapse, the sensibility of the skin was greatly diminished. Is not the sense of heat felt by the patient, while the temperature of his surface is below the natural standard, to be referred to a morbid sensibility? The intellectual faculties and the senses manifested no aberration. The mind was, however, enfeebled, and the moral sentiments dull and obtuse.

The *glandular secretions* were sensibly affected in this period. The urine was either wholly suppressed, or passed only in very minute quantities. The secretion of the bile appeared also to be suspended, or but formed to a limited extent. Very seldom was any appearance of bile to be detected in the matters vomited or dejected from the bowels. In some instances, however, green bile tinged the evacuations from the stomach. I observed the same fact in the cholera shed at Montreal. The case was exceedingly malignant. The hue of this patient's skin, a Swiss sailor, was plumbagenous; the green fluid continued to be ejected until his death. The tears are deficient; no feelings of distress bring moisture to the eye.

The exudation from the dermoid surface, external and internal, is greatly increased; and vitiated mucous, a creamy gruel-like matter, contained in large quantities in the intestinal discharges, or found in the intestines after death, are evidences of augmented as

well as perverted function in the secretory actions of the alimentary mucous membrane. The absence of expectoration, the aridity of the mouth and fauces, the huskiness of the voice, are evidences that the secretions of this portion of the mucous membranes are deficient.

The following cases are examples of the third period, or commencing collapse.

CASE XVII. *Diarrhœa six days; vomiting; cramps; cold surface; cold breath and tongue; feeble pulse; reäction; recovery.*

Letitia Lowber, a black woman, aged twenty-six years, was admitted in the Hospital, No. 5, at 11 o'clock, P. M. August 5th. She has been affected with diarrhœa for the last six days. Eat some indigestible food yesterday. This morning vomiting came on, and was seized with cramps in the lower extremities.

Condition on admission:—Skin cold and moist; cramps of the legs with occasional spasms; mind unaffected; temperature of breath and tongue, 90° Fahr.; voice changed in its character; respiration regular; pulse feeble, pulsations 128; thirst.

Sinapisms applied to epigastrium, to legs and arms; frictions made to the whole surface with brandy, having Cayenne pepper infused in it; dry heat subsequently by the application of heated oats in bags; acetat. opii, gtt. xx. and comphorated solution of bi-carbonate of soda iced, ℥ss. every fifteen minutes.

1 *o'clock, A. M.* Purging. Enema of acetat. opii, gtt. xl. in aquæ camphoratæ, Oss.

August 6th, 8 *o'clock, A. M.*—Has purged three times since last report, and vomited three or four times; discharges "rice water;" cramps occasionally, but much reduced in force and frequency; pulse 96; the skin warmer, soft to feel; profuse perspiration has ceased; tongue and breath of nearly natural temperature; stomach becoming settled. Iced camphorated solution of soda every two hours; iced gum water for drink.

10 *o'clock, A. M.* Nausea and disposition to vomit; in other respects improving; pulse rising; has acquired volume and force, and is slower.

11 *o'clock, A. M.* Vomited. Iced camphorated effervescing draught with acetat. opii, gtt. x.; same drinks; dry heat as before and sinapisms.

3 *o'clock.* Skin warm; tongue warm, moist, and slightly furred; pulse remains in its improved state. At 2 P. M. took some mutton water; continue iced saline drinks as before.

5 *P. M.* Improvement continues; frictions occasionally employed, and the epigastrium and limbs afterwards covered with cloths steeped in camphorated spirits; enema of carbon. sodæ, ʒii. in tepid water, Oj.

11 *o'clock, P. M.* In comfortable state; no cramps; skin warm; vomiting and purging have ceased; pulse natural; disposed to sleep; dry heat to lower extremities.

August 7th, 7 o'clock, A. M.—Did not sleep well; was restless; skin warm and dry; pulse excited. Black tea and iced water for drink; chicken water.

1 *o'clock, P. M.* Is feverish; pulse 108, soft and full; hands and feet colder than the rest of the body; has pain in epigastrium; abdomen tumid; eyes injected. Twenty leeches to epigastrium; extremities rubbed with camphorated spirits; dry heat to be applied to feet.

3 *o'clock, P. M.* Skin warm and with slight moisture; tongue furred and dry; a discharge from the bowels of a thick whitish fluid; has passed no urine since admission; pulse 112, compressible; eyes injected; pain of epigastrium diminished; leeches filled well, and bites continue to bleed; patient refuses the chicken water, and desires only the iced drinks; saline solution, ℥i. every two hours.

7 *o'clock, P. M.* Much better; symptoms of reäction are subsiding.

9 *o'clock, P. M.* Pain in epigastrium entirely relieved; pulse less frequent; feels more comfortable. Continue iced drinks and saline solution.

August 8th, 8 o'clock, A. M.—Three discharges from bowels since last evening of thin and watery fluid; has not urinated; other symptoms nearly disappeared. R. Ol. junip. gtt. v.; spt. nitr. dulc. gtt. x. to be given every two hours in sweetened water.

4 *o'clock, P. M.* Convalescing; has passed about two ounces of urine.

8 *o'clock, P. M.* Has urinated freely; convalescing.

August 9th. Passed a comfortable night; symptoms have disappeared. Chicken water for diet. Discharged from hospital on 11th of August.

Case XVIII. *Intemperate in habits; preceding diarrhœa; vomiting and purging; cramps; surface cold; hands and feet livid and shrivelled; tongue cold; reäction; recovery.*

August 6th, 7 o'clock, A. M.—Mary Donnelly, Irish woman, aged twenty-seven; nervous-lymphatic temperament; light hair and eyes,

and fair complexion; habits of intemperance; was discharged on Saturday 4th inst. from Arch street prison; had been slightly affected with diarrhœa for the last two weeks. This morning was attacked with vomiting and purging; soon after was brought into the hospital.

On admission, she presented the following symptoms. Skin cold and moist; tongue clean, cold to feel; cramps in the legs; hands and feet livid and shrivelled; elasticity of skin lost, does not retract when pinched up; pulse feeble; thirst very great; complains of internal heat; temperature of abdomen moderate; no pain from pressure; purging from the bowels, and vomiting of "rice water," which have been incessant from the period of attack this morning.

Treatment directed was sinapisms to legs and arms; dry heat to lower extremities; frictions; evaporation of camphorated spirit to be constantly maintained from the abdomen, by keeping it covered with linen saturated with the tinct.; iced gum water, in which bi-carbon. sodæ was dissolved, for drink; camphorated effervescing draught, with acetat. opii.

2 *o'clock, P. M.* Symptoms aggravated; whole surface livid and cold; drenched with perspiration; pulse feeble; cramps; vomiting, and purging. Directed hot brandy-toddy, and the following prescription:—Aq. ammon. alcohol. ℥i.; ether. sulphuric, ℥ii.; mucilage, ℥vi. ℥ss. to be administered every two hours; frictions to be continued.

5 *o'clock, P. M.* Pulse very feeble; surface universally cold, livid, shrivelled, damp with moisture; cramps in the legs; vomiting is restrained; occasionally ejects a limpid fluid in small quantities; purging not as copious. Enema of solution bi-carbon. sodæ, with acetat. opii, gtt. xxx.; frictions to extremities and body with warm spirit of camphor; the abdomen, legs and arms, after the frictions, enveloped in flannels saturated with spt. camphor; continue toddy.

8 *P. M.* Symptoms improving; slight reäction.

11 *P. M.* Still better; reäction more decided; disposed to sleep. Iced gum water for drink; stimulants suspended.

7th, 7 o'clock, A. M. Did not sleep well, was restless; much improved; skin is warm and pleasant; pulse increased in force, nearly natural. Iced drinks continued.

11 *o'clock, A. M.* Continues to mend; bowels purged three times, discharged a watery fluid. Enema of solut. bi-carbon. sodæ, Oj.; acetat. opii, gtt. l.

2 *P. M.* Enema remained half an hour; bowels not moved since; skin warm, soft, and pleasant; pulse natural; stomach settled; the shrivelled and livid appearance of the skin very much diminished, but not entirely disappeared; has passed no urine since yesterday

morning. Iced gum water for drink; loathes the toddy, which she says sickened her this morning.

9 *P. M.* Has nausea; vomiting has not returned. Aq. calcis, ℥ss. in equal quantity of milk every hour.

8*th.* Appears much better; has not urinated; complains of pain in pubic region; warm fomentations applied.

4 *P. M.* Complains of pain and soreness in epigastrium, augmented by pressure; skin warm; pulse 104; feels as though vomiting would relieve her stomach; tongue has become red; thirst urgent. Iced mucilage for drinks, and small pieces of ice kept constantly in the mouth. Effervescing draught cooled with ice.

10 *P. M.* Improving; discharges from the bowels of more natural appearance; took a cup of tea in the evening, it was immediately rejected by vomiting. Continue cold effervescing draught.

9*th*, 7 *A. M.* Had a good night; is convalescing. Chicken water.

10 *o'clock, P. M.* Continued to improve during the day. Discharged from hospital August 10th.

Observations.—In this case the previous circumstances of the patient—her habit of abusing the use of ardent spirits—the debility that had followed her temporary confinement in prison—the breaking up suddenly of the habit of daily stimulation, and the exhaustion occasioned by the protracted diarrhœa, rendered the employment of diffusible stimulants imperative for a short period, to avert the danger of sudden sinking. It is to be remarked in this case, that when reäction, though slight, was brought on, immediately the stimulants were instinctively rejected by the patient. To the language of the organs I am accustomed to listen always with great deference, and generally find the instinctive wants, or specific sensations of the organs, the safest guides to follow.

Case XIX. *August* 11*th.*—Elizabeth M'Connel, white woman, aged twenty-four years, admitted into Hospital, No. 5, at 7 A. M. She reports herself as having had diarrhœa for the last four days. At the period of admission, her symptoms were, frequent vomiting of a watery fluid, slightly tinged with green; cramps and spasms of abdomen; surface cold and moist; great oppression in the chest referred to the heart. An injection of flaxseed mucilage and laudanum were administered to check the diarrhœa.

8 *o'clock, A. M.* Same state; v. s. ℥x.; effervescing draught.

2 *o'clock.* More comfortable; oppression removed; skin comfortable.

8 *P. M.* General improvement; diarrhœa less frequent.

12*th.* Stomach nauseated; occasional vomiting. Renew the effervescing draught. Occasional watery discharges from the bowels.

2 *o'clock.* Decoction of rhatany and oak bark to restrain diarrhœa.

13*th.* Decoction of rhatany rejected by the stomach soon after being taken; discontinue it; skin warm; pulse rising. Twelve cups to epigastrium; carbonated water with bi-carbon. sodæ for drink; took during the day black tea, and chicken water.

14*th.* Slight febrile movement; stomach nauseated, and occasional vomiting. Iced carbonated water with soda; iced gum water, and arrow root for nourishment.

15*th.* Slept well; symptoms have all disappeared except nausea and occasional vomiting; no diarrhœa. Calomel, gr. ss. every two hours; same diet.

16*th.* Convalescent, and discharged to general hospital.

Observations.—The principal difficulty in this case was the irritable state of the stomach continuing after the subsidence of the general symptoms of cholera. As there was nothing threatening in this state, a very active treatment was not called for. The small doses of calomel appeared to exercise the most controlling influence in abating the irritable condition of the stomach.

Case XX. *August* 10*th*, 11 *o'clock*, *A. M.*—Was admitted into Hospital, No. 5, Nancy Bethe, female, native of Ireland, of good constitution, temperate, aged thirty-eight years, in the forming stage, was taken yesterday with diarrhœa, and has vomited frequently this morning; tongue cool; pulse feeble; and surface of body cool; is much distressed in mind, having lost her husband by cholera. Treatment—℞. Aqua camph. Oj.; bi-carb. sodæ, ʒii.; tinct. opii, gtt. l. M. ft. enema; sinapisms to extremities, and dry heat by bags of hot oats; frictions with camphorated spirit.

2 *o'clock*, *P. M.* Complains of thirst. Ordered pieces of ice to be held in the mouth.

5 *o'clock*, *P. M.* Has had three discharges from her bowels since 3 o'clock, P. M. Ordered an enema of flaxseed mucilage, Oj.; tinctura opii, gtt. lv.

10 *o'clock*, *P. M.* Is much better.

11*th*, 8 *o'clock*, *A. M.* Is convalescent; was anxious to return home, but was desired to remain for a day or two.

10 *o'clock*, *A. M.* Has clandestinely left the hospital.

12*th*, 8 *o'clock*, *A. M.* Has returned, having endured great fatigue from washing several rooms, a quantity of dirty clothing, and scrubbing a large court yesterday. Imprudent in diet; eat sausages for

supper. Has now severe cramps in her limbs; very frequent discharges from her bowels of a rice water appearance, and has frequently vomited a similar fluid; great soreness at the epigastrium. Fifty leeches to epigastrium; frictions with hot spirit of camphor; dry heat by means of hot oats to inferior extremities; enema of starch water, Oj.; bi-carb. sodæ, ʒj.; tinct. opii, gtt. xxx.

12 *o'clock*, *A. M.* Nausea and vomiting. ℞. Bi-carb. sodæ, ʒss.; aqua puræ, ℥i.; succ. limon. q. s. ad sat. to be given effervescing.

4 *o'clock*, *P. M.* Has dosed a short time; has had several discharges from bowels, and has vomited. Effervescing mixture as before.

6 *o'clock*, *P. M.* Has vomited the rice water fluid as heretofore, which, when tested with litmus water, gave indications of the presence of acid. ℞. Bi-carb. sodæ, ʒiii.; iced water, Oj.; dose one to two table-spoonfuls occasionally.

11 *o'clock*, *P. M.* Has not vomited so frequently since the last prescription.

13*th*, 8 *o'clock*, *A. M.* Discharges from stomach and bowels greatly diminished. Ordered a table-spoonful of decoction made from rad. rhatany, ℥ss.; cort. quercus nig. ʒi.; aquæ puræ, Oj.

11 *o'clock*, *A. M.* The last prescription was vomited soon after it was administered. Takes arrow root for nourishment, and carbonated mineral water in doses of two table-spoonfuls for drink.

3 *o'clock*, *P. M.* Has eaten soup clandestinely, which produced a return of the discharges from the stomach and bowels.

6 *o'clock*, *P. M.* Is much prostrated by the frequent discharges excited by her imprudence, is now restricted to arrow root for nourishment, and gum water for drink.

11 *o'clock*, *P. M.* Discharges from bowels and vomiting greatly diminished.

14*th*, 11 *A. M.* Convalescent.

15*th*, 11 *A. M.* Same.

16*th*, 11 *A. M.* Cured.

Observations.—Bethe accompanied her husband to the hospital; he was when admitted in the last period of the disease, and in its worst form. She assisted the attendants in his treatment. Soon after his death she manifested symptoms of the disease—she was placed immediately under treatment, and the symptoms disappeared. Disliking the restraint placed on her eating, she left the hospital the next day without permission. She immediately went to work, washing rooms and clothes, and eat heartily of sausages and fresh bread. A relapse ensued, and she reëntered the hospital with the disease advanced to the third period. The contents of the stomach had been ejected by

vomiting, but the stomach continued to exhibit marks of great irritation; vomiting was frequent; the tenderness of the epigastrium considerable, and she complained constantly of the pain she experienced in the stomach. The application of the leeches to the epigastrium produced a prompt effect in arresting the frequent vomiting and discharge of watery fluid. For some hours she continued still to be affected with nausea and repeated efforts at vomiting, though very little fluid was discharged. The treatment was then directed with a view to keep in check the return of the copious and exhausting evacuations, to excite the external surface, and to furnish a new supply of fluids by giving her frequently to drink of iced water, iced carbonated water, and iced saline solutions. Under this method the symptoms were arrested in their progress—they continued to abate, and then very gradually reäction and diffusion became apparent, with a restoration of the functions and energies of the economy.

Case XXI. *Cholera, third period; vomiting and purging; cramps; coldness of surface and extremities, with shrinking of skin; diarrhœa for three days before admission; intemperate habits; reäction and recovery.*

August 11*th.*—James Dick, a native of Scotland, lived in the same house with Bethe and his wife, was admitted to the hospital at 8 A. M. This man has been intemperate, and for some days he, as well as Bethe, have been almost living on whiskey. Was attacked on the 8th with diarrhœa, for which he has received no treatment.

On admission the external surface was cold; hands and feet cold and shrivelled; tongue cold and moist; mucous membrane of lips and gums livid, cold, and vessels deeply injected—the circulation in it feeble. The pulse frequent and feeble; countenance expressive of great anxiety and distress; vomitings and purging of rice water fluid; cramps.

Sinapisms were applied to epigastrium, to the chest, and the extremities; effervescing draught; iced drinks as in preceding cases. No amendment during the day; pulse failing; vomiting and purging continue, but less frequent.

8 *P. M.* In consequence of the habits of the patient, ordered weak brandy-toddy for drink, and gave carbon. ammoniæ, gr. v. every hour; copious dejections from bowels, and at same time vomiting; character of discharges the same. Enema of starch with tinct. thebaic, gtt. lx.

12*th*, 8 *A. M.* Purging continues; covered with cold sweat; complains of great uneasiness at the epigastrium; pulse feeble; light wan-

dering of the mind. The external surface was rubbed with powdered hot chalk; an enema of decoct. rhataniæ, ℥iss.; starch water half a pint, and tinct. thebaic, gtt. xx. directed, and to be repeated after every evacuation. The stimuli were withdrawn, and twenty leeches applied to the epigastrium; the first injection was retained half an hour.

12 *M.* Purging continues; decoction of rhatany and oak bark, ℥ss. every two or three hours.

6 *P. M.* An evident improvement; vomits occasionally—fluid is bilious; the fluid turned litmus water green. Effervescing draught.

13*th.* During the night has had very few evacuations; complains of nausea, but has ceased to vomit. Is decidedly in a better condition; cold sweat has disappeared; skin warm; pulse has more force; complains of pain in right hypochondrium, and comatose symptoms appearing. Eight ounces of blood were drawn from the epigastrium and right hypochondriac regions by cups; gum water for drink; arrow root for nourishment, and the following saline solution—Bi-carbon. sodæ, ℥i.; aq. carbonat. ℥viii.—℥ss. to ℥i. every fifteen minutes or half hour.

4 *o'clock, P. M.* Improving; vomited once.

8 *o'clock, P. M.* Continues to improve.

14*th.* Passed a good night; no further evacuations. The amendment continued to progress during the day, and in the evening at 6 P. M. was pronounced convalescent.

15*th.* Nausea with slight vomiting; no alvine dejection for upwards of twenty-four hours. Calomel, gr. ss. every three or four hours; the saline drink continue. Discharged to convalescent hospital.

Observations.—Dick had been indulging in his habits of intemperance for some days prior to his attack. He was much exhausted at the time of his admission into the hospital, by the diarrhœa, which was then of three days continuance. His habitual abuse of ardent liquors, in connexion with his state of exhaustion, imposed a necessity of resorting to stimulants in the first instance to prevent his sinking. On the second day from his entrance, the evidences of gastric inflammation presenting themselves, the stimulant treatment was immediately abandoned. The object of their administration was then obtained. The organs were resuming their energies—a local reaction was being established. Under its influence the serous effusions—the waste of the fluids—are arrested. The immediate danger from exhaustion produced by profuse losses, disappears as inflammation is substituted for irritation—but unless this be checked in time, an equal danger, though more remote, assails the patient. The pure-

ly antiphlogistic treatment was then adopted, the inflammatory symptoms were arrested, and the case terminated favourably.

In the preceding cases the characteristic symptoms of the third period are well marked. The losses by the evacuations, from their quantity, now begin to be felt. The circulating fluid manifests a commencing change in its condition, it is deficient in quantity, the force of the circulation is diminished—the blood is not propelled into the whole area of the vascular system. It abandons the exterior surface—other organs do not receive their appropriate supply—to the primary interior determination is now added a fixed concentration, a paucity of the fluids, exhaustion of the forces of the circulation, and consequent inability for the production of reäction.

The constitutions of the patients the subjects of the foregoing cases being good, the object of the treatment was to allay internal irritation—to supply by copious drinks the losses of the watery fluids of the economy, and to produce diffusion by external revellents.

Fourth period, confirmed collapse.—If the disease be not arrested in the third period, the patient soon passes into the fourth, when his condition is truly desperate. To adopt the phrase of MAGENDIE, he is *cadaverized.* The appearance he exhibits is frequently that we may conceive of a corpse, inhumed some days, suddenly reänimated. In the greater number of cases the regular progression of the disease, such as has been described, is very evident, and may readily be traced. In some few, the patient sinks at once into the exhausted and moribund state, which is the character of this period. Those individuals were the very aged, persons of infirm health, and broken down constitutions, the effect of disease, or gross intemperance. The period occupied in the approach of this stage generally corresponded with the forces of the patient and the extent of the losses sustained from the evacuations.

The phenomena attending on this period, are those of the preceding carried to the point of extreme aggravation. For the most part, it is a moribund condition—it is a state analogous to the last periods of particular cases of malignant fevers, and to the algid form of intermittent. I can recall many instances of malignant yellow fever, and of the malignant typhus which formerly prevailed as an epidemic in our Alms-house, presenting symptoms approaching very closely to those characteristic of this period of cholera. So strongly was I struck with this resemblance when I saw for the first time this disease on entering the cholera shed in Montreal, that I exclaimed to my associates—this is the typhus of our Irish emigrants in the Alms-house.

In yellow fever I have repeatedly witnessed the patient in possession of his senses, pulseless, the entire surface cold, and bathed in cold perspiration; the hands and feet shrivelled and sodden; the stomach highly irritable, vomiting frequent, and dejections copious. The discharges are, however, entirely different. In cholera the serous and watery fluids are effused and discharged; in yellow fever it is the colouring matter and globules of the blood, forming the black vomit and dark melœnic stools. The result is the same—prostration and exhaustion of the circulating forces, absence of pulse, and failure of the vital functions, attended with nearly similar symptoms.

The phenomena attending on this period, from their extraordinary character, and the rapidity with which they are induced, have almost exclusively fixed the attention of observers. In the early accounts of cholera, they were taken as the type of the disease; the first periods were unheeded and unnoticed. At this time a distinction is made by many writers between them—the term cholera being exclusively appropriated to the last periods, and cholerine or choleroid to the first. The difference is, however, only that which exists between a simple remittent fever, and one that is fatal; or between any disease in its inception, and the period of moribund exhaustion.

The symptoms of the fourth period are the mere aggravation of those that immediately precede it; or are the result in the prostration of the powers of life, and the exhaustion of the vital functions, necessarily produced by their persistance.

The evacuations continue upwards and downwards, often with unabated violence. The discharges from the bowels are frequently involuntary, the fluid either running from them in a stream, or escaping in spurts every few minutes. In a small number they cease entirely, and are suppressed several hours previous to death; but in most instances they are excessive until the period of dissolution, especially the intestinal discharge.

The circulation, both general and organic, has nearly ceased. Every where the pulses have disappeared; even the carotids no longer beat. The ear applied over the heart can distinguish only a feeble sound of its contractions; the blood pressed from the superficial veins returns with a creeping and sluggish movement. The organic circulation is almost extinct. If the under lip be turned down, its interior is found dark, livid, its small vessels injected, and if pressure be made with the finger, not a globule of blood is forced from the tissue—the blood is stagnant—the colour remains unchanged. This symptom I found invariably to be a fatal sign. While the organic circulation persists a possibility of recovery remains, but when it has terminated the

power of recovery is destroyed. The stagnancy of the circulation in the labial mucous membrane is probably indicative of its condition in all the internal mucous surfaces, and in the pulmonary bronchial membrane must interrupt the function of respiration. The bronchial mucous membrane ceasing to transmit the blood, it must accumulate in the right side of the heart, and impede the whole venous circulation. In a case in which cerebral congestion existed, this mode of arrest in the circulation appeared very evident. The temporal artery was excessively distended, but did not pulsate. I prevented the flow of blood from the trunk by pressure, and then emptied the ramifications by forcing the blood from them, but it immediately returned back from its capillary extremities. The circulation of the skin is in the same stagnant condition; hence its colour, varying from red-brown to indigo-blue and plumbaginous-black. In Montreal cholera shed, and the Park hospital, New York, I saw patients who had the appearance of coalmen, or blacksmiths working in their smithery. I inquired of the first one I saw having this semblance, whether he was not a smith. In this city I did not witness a similar case. Our worst were, however, amongst blacks, in whom this character could not of course be discovered.

The blood drawn from the vessels in this stage is found to be thick, of a syrupy consistence, and is black, even in the arteries—hematosis, or production of arterial blood, the sanguine nutritive fluid, indispensable to vital activity, no longer proceeds, which becomes a new cause of death. The globules examined with the microscope were found to be perfect.

The animal temperature, always the best standard or measure of the force of vital activity and energy of the organic circulation, corresponded in its depression with the sinking state of the vital movements. The thermometer in the mouth indicated 90°, 91°, and 92° of temperature; in some instances as low as 84°.

The respiration did not present a constant character. In many cases it was feeble, slow, and often scarcely perceptible. In other cases it was hurried, laboured, and oppressed. Precordial distress, and a suffocative feeling, were very common.

The nervous phenomena differed but very slightly from those of the third period. The intellectual and moral faculties were dull and sluggish. The mind manifested a total want of activity—an extreme degree of feebleness, but seldom decided delirium or great irregularity. The moral being was, as it were, annihilated. The moral sentiments were extinct; no emotions even in circumstances of the utmost distress could be excited. "The movements of the spirits

were dull as night, and the affections dark as Erebus." The senses were generally torpid; hearing was most affected; the patients complaining of a peculiar sensation in the ears. Patients would often continue in possession of their senses until within a few moments of their decease. Others would be in a half torpid state, from which they could, with difficulty, be roused; while others fell into a sleep, in which they sunk into the arms of death. As respects cramps of the muscles, in some they disappeared, while in others they continued not only until death, but even after the patient had ceased to breathe, for a considerable period, the muscles were spasmodically moved.

The following cases are exemplifications of this period of the disease.

Case XXII. *Complete collapse; skin cold, inelastic; no pulse; cramps; vomiting; purging; profuse cold sweat; death.*

August 3d.—Isaac Maxwell, a black, aged forty-six years, was admitted into hospital, No. 5, at 9 o'clock, A. M. Habits of extreme intemperance. Seized last night with vomiting, purging, and cramps. Had been unwell some days. On admission, in confirmed collapse. Surface cold, and bathed in cold sweat; temperature of the mouth 84°; temperature of the atmosphere 78°; hands have sodden appearance; skin inelastic; circulation of lips and gums scarcely perceptible; pulse imperceptible at wrists; sound of the heart's action barely to be distinguished; frequent cramps and spasms, with vomiting and purging; voice feeble.

The treatment directed was sinapisms to epigastrium and extremities; frictions with terebinthinate decoction of cantharides, followed by application of dry heat; acetat. opii, gtt. xxx. was administered; brandy-toddy was given with aquæ ammoniæ, gtt. ii. every fifteen or twenty minutes.

11 *o'clock, A. M.* The spasms and cramps very soon abated, and have not returned. Lower extremities are warmer. Æther chloric, ℥ss.; dry cups to the epigastrium. Treatment continued.

1 *o'clock, P. M.* Skin warmer; cold sweat has diminished; voice stronger; feelings are more comfortable. Has camphorated gum water for drink.

3 *o'clock, P. M.* Skin has become quite cold, and covered with copious cold sweat; the bed-clothes drenched with moisture; purges, but does not vomit. Warm applications renewed; frictions made with flesh-brush sprinkled over with equal parts of Cayenne pepper and powdered alum; æther sulphuric, ℥i.

5 o'clock, P. M. Skin universally cold, and bathed in cold sweat; pulse not perceptible at wrists, just distinguishable in carotids. Treatment continued without remission.

7 o'clock, P. M. Pulse returned, but feeble; has slept since six o'clock. Continue same internal stimulants, with the external revulsives.

8 *o'clock.* Continues to dose; more warmth of skin; pulse remains, though feeble; cold sweat streaming from every pore; breathing becoming laborious. External revulsives; frictions.

9 *P. M.* In profound coma; breathing stertorous; no pulse; pupils contracted; general coldness; expired at 9½, twelve hours from the time of entrance.

Observations.—Maxwell was amongst the earliest cases of collapse brought to the hospital. At this time it was the general impression, derived from the English and Scottish authorities principally, that the excessive coldness of the patient was an indication for the application of artificial heat, and was the most appropriate remedy. The habits of the patient, and the degree of exhaustion manifested, appeared to demand the reviving and animating influence of stimuli. It soon became obvious that external heat, so far from relieving the patient, really increased the collapse, by augmenting the losses he experienced from the skin—the immediate cause of exhaustion. The stimuli were equally unavailing in rousing the declining energies of the patient. In this case, after admission, the vomiting and purging were speedily arrested. The uncontrollable symptom was the profuse sweating, prostrating the powers of the circulation.

Case XXIII. *Advanced to fourth period; complete collapse; vomiting and purging; cold surface; cramps; cold breath; no pulse; profuse cold sweat; slight reäction; coma; death.*

August 5th.—Samuel Bewley, a black, admitted to Hospital, No. 5, at 11 A. M. Habits of patient, intemperate in the use of ardent liquors. Had just been discharged from Arch street prison, where he had been confined for two months—the disease prevailing in the prison. He was attacked this morning suddenly with vomiting and purging. On admission, was in state of collapse; pulse scarcely perceptible at wrist; surface cold, shrivelled, and bathed in cold moisture; tongue whitish, moist, and cold; was seized after admission with cramps in hands and feet.

Sinapisms were applied to epigastrium, legs and arms; frictions made with terebinthinate decoction of cantharides; camphorated ef-

fervescing draught, with acetat. opii, gtt. v. in each dose; an enema of mucilage, with acetat. opii, gtt. xx.; dry heat. The incessant vomiting and purging were allayed.

1 *o'clock, P. M.* Cramps continue in legs. Enema of aqua camphorata, with acetat. opii, gtt. xx.; pulse and skin the same. The extremities and body rubbed with the following irritating liniment—Mustard, ℥ii.; Cayenne, ℥i.; camphor, ℥ii.; ungt. merc. ℔ss.; and of the following solution, ℥ss. given every fifteen minutes—Aquæ camphoratæ, Oj.; bi-carb. sodæ, ʒiv.

1½ *o'clock.* Frequent cramps; vomiting and purging of clear watery fluid; surface cold; pulse very feeble, 94 in minute; no sign of reaction. Acetat. opii, gtt. xxx.; enema, aq. camph. Oj.; acetat. opii, gtt. xl.

3 *o'clock.* Vomiting, purging, and cramps have ceased; disposed to sleep. Frictions have been continued without cessation for last hour and half; complains greatly of the warm applications; cutaneous surface and pulse remain the same. Five cups to the abdomen, and as many to the spine—very little blood could be obtained; the capillary circulation appeared to be nearly extinct; the abdomen, chest and extremities were covered with sinapisms; same internal treatment.

4 *o'clock.* Surface is warmer, has become dry; pulse rising, has more volume and force; complains greatly of thirst; keeps small pieces of ice in his mouth, and takes his drinks cooled with ice.

5 *o'clock.* Refuses every thing but iced drinks; complains that his ears are stopped up, and his sight is dim; very restless; breath and tongue are warmer. Sinapism reäpplied to abdomen.

10 *o'clock, P. M.* The reäction has given way; surface again cold, and covered with clammy sweat; skin inelastic and shrivelled; vesication in different parts of the body and extremities.

6*th*, 1 *o'clock, A. M.* Collapse advancing. Following prescription—Spt. ammoniæ, æther sulph. āā. ʒii.; acetat. opii, ʒss.; aquæ puræ, ℥vii.—℥ss. every two hours.

8 *o'clock, A. M.* Efforts at reäction; skin warmer.

11 *o'clock, A. M.* Skin warm; pulse at wrist, though feeble; has been since 8 o'clock with tendency to coma; not easily roused; answers with difficulty; some incoherence; skin vesicated. Cups applied to back of neck; bled freely, ℥x. obtained; head was relieved.

2 *o'clock, P. M.* Sinking; no pulse at wrist; in complete stupor; respiration irregular, with long intervals. Stimulants freely exhibited without effect. Died at 4½ o'clock, P. M.

Observations.—When cholera broke out in the Arch street prison, with the fatal violence that characterized it in that establishment on the 5th of August, as many of the prisoners confined there as it was possible were discharged. Amongst those dismissed was Bewley, who was immediately attacked by the epidemic. Nearly all those who took the disease on the 4th and 5th in the Arch street prison perished with it.

This case exhibited the symptoms in their most malignant aspect. The economy made an effort at reäction, but did not possess sufficient energy to render it effective or diffused. The patient did not succumb under the exhaustion of profuse losses, which were arrested, but from the brain, a profound comatose state being induced.

Case XXIV. *Fourth period; complete collapse; previous diarrhœa; no pulse; algid; profuse sweat; vomiting and purging; cramps; cerebral reäction; coma; apoplectic state; death.*

August 6th.—Matilda Williams, aged twenty-four years, a white woman, of dissolute life and intemperate habits, just discharged from Arch street prison, was brought to hospital, No. 5, at 7 o'clock, A. M. She had been affected with diarrhœa for ten days. This morning before day began to vomit and purge; was seized with cramps. On admission, the surface universally cold; extremities livid, shrivelled; skin inelastic, covered with cold, profuse sweat; no pulse at wrist; temperature of tongue 89°; respiration not affected; discharges from stomach and bowels a thin, watery, and nearly clear fluid.

Sinapisms were applied to epigastrium, legs and arms; frictions made with Cayenne, infused in hot brandy; ℥i. camphorated solution of soda, with acetat. opii, gtt. xl.; enema of camphorated water with acetat. opii.

11 *o'clock.* Slight reäction; says she is more comfortable; pulse perceptible at wrists; surface of body cold and moist; cramps occasionally, but mitigated in force; complains bitterly of the sinapisms on her legs, which have been removed; thirst intense. Iced gum water for drink.

2 *o'clock, P. M.* No improvement; cold, drenched with sweat; livid; cramps in legs. Acetat. opii has been given in camphorated water, and saline solutions. Ordered hot brandy-toddy; spt. ammoniæ, æther sulphuric, āā. ℥i.; mucilage, ℥vi.—℥ss. every two hours.

5 *o'clock, P. M.* No change; body and extremities enveloped in flannel steeped in spt. camphor; continue stimulants; two enemas of saline solution have been given and were retained.

8 *o'clock, P. M.* Patient sinking; respiration irregular, at long intervals; no pulse; insensible; swallows with difficulty.

11 *o'clock, P. M.* Profound coma; stertorous breathing; surface quite hot; eyes injected and rolled upwards; carotids pulsate with great force; moans. Blood was drawn from the head by cups, and ice applied, with dry heat to extremities. Died at half past twelve.

Observations.—The case of Williams was of aggravated character, and hopeless from the period of her admission. The circumstance in this case worthy of notice, is the sudden production of a strong reaction directed chiefly to the brain, inducing a complete apoplexy.

Case XXV. *Fourth period; previous diarrhœa, which had ceased; cramps; universal coldness; profuse sweat; death in six hours from admission.*

August 9th.—Letitia Parker, aged fifty-five, black woman, of intemperate habits, was admitted in Hospital, No. 5, at 7½ o'clock, P. M. She had been suffering from diarrhœa for the last three or four weeks; no vomiting. On admission stomach and bowels were quiet; pulse very feeble; body universally cold, and bathed in moisture; temperature of tongue, 90°; cramps of the extremities; no thirst; no pain in abdomen or sensitiveness to pressure; abdomen cold.

Stimulants were freely administered, both internal and external, without effect. She continued to sink, complaining of no particular uneasiness, without discharges from the stomach or bowels; perfectly passive and indifferent to every thing around her. Died at 1 o'clock, A. M. six hours from admission.

Observations.—The long-continued diarrhœa under which Parker had laboured, had exhausted her forces, which were still more reduced by the profuseness of the cutaneous exhalation. In this case is presented an instance of the entire cessation of the discharges from the alimentary canal for some hours previous to death. Had not inquiries been instituted, it might have been supposed that collapse had taken place without any losses of the fluids having been experienced.

Case XXVI. *Fourth period; excessive intemperance; profuse evacuations; rapid collapse; exhaustion and death.*

August 9th.—James Bethe, aged thirty-two years, a native of Scotland, a strong, muscular man, sanguine nervous temperament, a weaver, of intemperate habits, and had been for the last week on a drinking frolic, during which he was repeatedly drunk, was admitted into the hospital at 11 o'clock, P. M. He was reported as having been seized two hours before admission with vomiting and purg-

ing of a thin watery fluid, and a severe pain in the epigastrium. On his entrance his pulse was nearly natural, and skin in good condition. His thirst was excessive, and the most copious discharges were poured forth from his stomach and bowels; the fluid nearly as colourless as spring water. Sinapisms were applied, opium administered; six ounces of blood were drawn by cups applied to the epigastrium; extremities rubbed with hot spirit of camphor, and enveloped with flannel steeped in the same; dry heat to the feet; takes ice water, and holds pieces of ice in his mouth.

12 *o'clock.* One hour from admission—evacuations upwards and downwards incessant and most copious; prostration and collapse complete; surface cold and moist; fingers and feet blue and shrivelled; elasticity of the skin lost; pulse indistinct; frequent cramps. Tinct. thebaic, gtt. lxx. in camphorated effervescing draught given; opiate injection; solution of soda in mineral water; frictions and sinapisms continued.

1 *o'clock, A. M.* No change; restless.

4 *o'clock, A. M.* Jactitation and anxiety great; evacuations continue; thirst, and desire for cold drinks intense; countenance anxious and livid; eyes deep sunk in their sockets; skin cold and livid; pulse barely perceptible; circulation in the interior of the lips has ceased; breath cold; nothing remains on the stomach. Hot toddy; injections of starch and laudanum, gtt. 100.

9 *A. M.* No amendment; incessant cry for cold drinks. Frictions have been continued; sinapisms applied and reäpplied; various internal diffusible stimuli; but the stomach has continued to discharge profusely a thin, clear, watery fluid—two large buckets have been filled, and a third is now half full of the fluid received from the stomach; much has also been evacuated on the floor. A strong decoction of capsicum was tried, but without effect. A saturated solution of common salt was administered with the effect of checking the vomiting. Calomel, gr. xl. were given, and in fifteen minutes gr. xx. more.

12 *M.* Patient in hopeless state; no pulse; capillary circulation stagnant; universal coldness. Expired at 12½.

Remarks.—The rapid progress of this case, and the violence of the symptoms, are unquestionably to be ascribed to the brutal intemperance of this individual. In the week of his attack he had been repeatedly drunk, and during that time had subsisted almost exclusively on whiskey. The quantity of fluid evacuated was greater than I have ever witnessed in any subject of disease. While in the hospital he filled three of the largest size water-pails with the fluid

ejected from the stomach alone, independent of what was discharged before admission, or that passed from the bowels.

Case XXVII. *Fourth period; intemperate habits; diarrhœa and vomiting twenty-four hours; profuse purging; rapid collapse; death.*

August 10th.—George Nedile, a black, hod carrier, was admitted into hospital at 4 o'clock, A. M. Has habits of intemperance. For last twenty-four hours has been frequently vomiting, and had diarrhœa. These symptoms augmented in the night; cramps came on, and the patient finding himself so much worse, got up and walked to the hospital.

On admission he had cold surface bedewed with cold, clammy sweat; pulse nearly extinct; vomiting not so urgent, but purging incessant; breath and tongue cold; inside of lips and gums livid, and the circulation there stagnant; skin of hands and feet shrivelled and inelastic; violent cramps of upper and lower extremities, and of abdominal muscles.

Frictions were made; sinapisms applied; hot toddy, and opium administered; dry heat; enemas with laudanum.

No effect resulted from the remedies; the purging continued excessive; and the patient died at 8 o'clock, A. M. four hours from admission.

Remarks.—The stagnant state of the capillary circulation in the interior of the lips, I have always found a fatal sign. So long as the circulation there has some energy, that the blood can be forced from the tissue by pressure with the finger, forming a white spot, and returns again with moderate freedom, there remains a prospect of recovery. But when the blood is stagnant in this tissue, and ceases to circulate, it is probable, the same condition prevails extensively, even to the bronchial mucous membrane, and consequently the respiratory process, as it regards the changes in the blood, is more or less suspended. The purging in this individual was most excessive.

Case XXVIII. *Cholera of first period; cured; relapse; rapid passage to the fourth period; preceded with loss of voice and faintness; death in six hours from attack.*

August 11th.—Was requested to visit Mrs. F. This lady was seventy-eight years of age, and exhibited the effects of time on the constitution. She had almost entirely lost her hearing, her hair was perfectly white, and skin furrowed with wrinkles. During last night she had been attacked with purging, and acute pains in the bowels. The purging continuing, I was sent for this morning. The pulse was

feeble, and skin cool; the stools were thin and watery. A sinapism was applied to the stomach; an enema of flaxseed and laudanum was administered, and the following pills directed:—℞. Mass. hydrargyri, gr. viii.; ipecac., opii, ää. gr. iv. Divid. in pill. iv. A pill to be given every two hours. The purging was arrested very speedily, but the stomach became affected at 2 P. M. and she vomited several times. The pills were discontinued; the effervescing draught administered; a sinapism applied to epigastrium. In the evening the symptoms had disappeared.

12*th.* Had passed tranquil night; stomach and bowels no longer disturbed.

14*th.* Mrs. F. had remained without the slightest apparent effect from the former attack. She had been going about as usual during yesterday and this morning, and her family had remarked that she appeared uncommonly well. Last night being warm, she had complained of having perspired very freely. At 11 o'clock, A. M. while engaged in her ordinary pursuits, her voice suddenly failed, and she became faint. She was conveyed to bed, and a messenger despatched for me. Being from home, Dr. S. residing in the neighbourhood, was desired to visit her. He found nothing to excite alarm, except the feebleness of the voice, reduced to a whisper. No evacuations had taken place; the faintness had left her after lying down. Dr. S. finding no symptom requiring attention, quieted the fears of the family, and merely directed the patient to be kept at rest. He had not been gone more than half an hour when excessive evacuations occurred from the bowels, attended with copious vomiting. I arrived between one and two, when complete collapse was already established. The discharges had been of a fluid, scarcely turbid, with some few flocculi. The surface was cold; pulse had ceased; the hands and feet were shrivelled and blue; the skin inelastic; the voice almost inaudible; cramps of the lower extremities frequent and severe; thirst ardent. Frictions, sinapisms, and various external revellents were brought into action; opiate enemas; diffusible stimuli; saline solutions with camphorated water were exhibited.

At 3 P. M. the evacuations had entirely ceased; the pulse acquired some energy; the skin became dry, and the temperature improved, a faint effort at reäction was established. This apparent amendment soon gave way, and death took place between five and six o'clock, about six hours from the attack.

Observations.—This case is remarkable by the peculiarity of the invasion of the disease in the relapse, or the second attack. Loss of the voice and a disposition to fainting preceded the evacuations. These did

not commence until an hour after the former symptoms. Dr. S. a very respectable practitioner, saw nothing to induce him to suppose the patient was threatened with cholera; yet in a short period after he had left her, the symptoms set in with great violence. Is not the sudden prostration of the strength in this case, without any losses having been sustained by evacuations, to be attributed to the determination of the blood to the alimentary mucous surface, the consequence of irritation, and the immediate precursor of the discharges? From a movement of this kind, exhaustion of the forces of other organs must be induced. In an aged person, the quantity of whose fluids is always diminished, debility and exhaustion of vital activity by the abstraction of the circulating vital fluid is induced, either by moderate evacuations, or congestions of no great intensity or extent.

Case XXIX. *Cholera, fourth period; preceded with vomiting, diarrhœa and cramps; seven months pregnant; sense of suffocation; great distress; universal coldness; total absence of pulse; livid skin, cessation of discharges; reäction; abortion; recovery.*

July 28th.—Mary Queen, aged thirty years, an Irish woman, employed in reeling, was admitted at 9 o'clock, A. M. into Hospital No. 5. Vomiting and purging had existed between two and three days. Feeling exhausted, she left her employer, to go to her usual residence last evening. Before she reached the house, violent abdominal spasms came on, with cramps in the limbs. The inmates alarmed in regard of cholera, refused her admission, and she was compelled to remain in the yard during the night, lying on the ground. In the morning her situation was represented to me by some of the neighbours, when I had her brought to the hospital.

On admission the following symptoms existed:—The surface of the body was universally cold, yet she loudly complained of the heat; the breath and tongue were cold, the last coated with fur; no pulse could be distinguished at the wrists or elbows. The colour of the skin was of purple red, similar to that of the unripe damson plumb. This colour was most intense on the hands, forearm and feet—on the face it was dusky. The countenance was haggard, and expressive of great oppression. Respiration laboured, irregular; she insisted on it that she was suffocating, and constantly demanded to be taken into the open air. The chest yielded to percussion a clear resonance, and the respiratory murmur was distinct and clear in every part of the chest. The voice was altered, like that of a person labouring under severe cold; at times hoarse, suddenly becoming a whisper;

thirst was excessive. Soon after admission she vomited a clear watery fluid, and the stomach appeared very irritable. This was the first case of cholera admitted into the hospital under my charge, and from the existing symptoms, stimulants appeared the remedies indicated for the production of reäction, excitement of the circulation, and its diffusion. The patient, however, manifested an instinctive abhorrence of them. A number were tried, but were rejected by her the moment they were placed in her mouth; she declared they would sicken her stomach and make her vomit. Brandy, wine, spt. ammoniæ and others, were in succession attempted to be forced on her. Her resistance could not be overcome. Her incessant demand was for cold drinks.

The external application of heat, particularly by vapour, was at this time highly recommended, and much in vogue. This patient protested vehemently against all warm applications—heat will murder me, was her constant exclamation—give me cold—cold. Nature is an instructor whose lessons are to be preferred to scholastic authorities, and the instinctive sensations of the organs are her language. The effervescing draught iced, and iced water were instituted, for the stimulants. They were taken with avidity and delight, and largely demanded. The dose repeated every fifteen or twenty minutes; the abdomen was covered with a sinapism; same application to the extremities.

12 *o'clock.* Skin continues cold; no pulse to be felt; restlessness increased; sense of suffocation most distressing; the vomiting and purging are arrested. The whole surface rubbed with terebinthinate decoction of cantharides. At 1 o'clock the extremities were enveloped in plasters composed of camphor, capsicum, mustard and mercurial ointment.

5 *o'clock, P. M.* Stomach and bowels have remained quiet; is more composed; skin has acquired some warmth; a feeble pulse at the wrist; respiration is freer, and the voice more natural; continue treatment.

8 *o'clock, P. M.* Reäction decided; skin warm and soft; pulse has considerable volume and force; respiration large and regular; takes iced gum water; stomach and bowels continue quiescent.

11 *o'clock.* Progressive improvement; febrile action; cool mucilage of flaxseed administered as an enema.

29*th*, 3 *o'clock, A. M.* Got up to close stool, and passed without pain a dead fœtus, the colour of which was nearly black; the delivery was attended with very little loss of blood; reäction soon

after flagged, and a tendency to collapse was manifested. Frictions were instituted; dry warmth applied to the feet, and acetat. opii administered.

12 *M.* Reäction again established; skin warm; pulse full and firm. Although no discharge took place at the time of delivery, the loss of blood is now profuse.

8 *P. M.* Patient convalescent; uterine hæmorrhage has ceased.

This patient continued to amend, and was discharged August 6th. Four days after her recovery, the skin of the abdomen and of portions of the extremities to which the sinapisms had been applied, but which previously had produced no effect, inflamed and vesicated. They were very sore. The detached cuticle retained the discoloration of the state of collapse, and displayed a striking contrast with the clear white of the now healthy surface.

Observations.—This patient manifested the symptoms existing in the commencement of the fourth period. Its further progress was arrested by the cessation of the evacuations. She suffered no losses by the skin, which, though cold, remained dry, and this was an additional circumstance, that preserved her from the last stage of collapse. May not her exposure from lying on the pavement of the yard throughout the night, at the commencement of the last periods, have possessed an agency in preventing the excessive perspiration, or rather cutaneous leakage, and have preserved her from the exhaustion consequent upon it? Until this case, the patients received into the various hospitals, had been treated with steam baths or heated vapour. I had assisted my associates charged with the care of those establishments, and it was the general impression, that this means hastened the extreme collapse by the profuse discharges it caused. None of the patients survived over a few hours. This case made a strong impression on my mind, and gave a new direction to the treatment I pursued.

Case XXX. *Advanced collapse; previous debility from low diet, fatigue, and want of rest; cold surface; shrivelled skin; blue colour; no pulse; cramps; dejections; cessation of cutaneous transpiration and purging; reäction; recovery.*

I was requested by Dr. Beattie to visit with him a patient, J. S. on Friday, August 24th, who had been attacked that morning with cholera. He was an Irishman, aged twenty years, of sanguine-nervous temperament, and employed in a wholesale store in Market street—his constitution vigorous. With a view to guard against the disease, and misunderstanding the general directions in respect to diet, published by the public authorities, the family had lived for the last three

or four weeks on a most abstemious diet. It consisted of bread and tea with a little chipped beef, for each meal. For a few days immediately preceding the attack, he had been subjected to considerable moral excitement, suffered from loss of rest and great fatigue. The Monday previous, his mother had become a victim to the epidemic, after a few hours illness, and on whom he had faithfully attended. Immediately upon her decease, he started to the country, to bring his sister to town, that she might attend the funeral. The gig broke down on their return, and he was compelled to drag it the distance of a mile in the heat of the day to have it repaired. As soon as the funeral was over, he again took his sister to her residence in the country, and returned during the night to his house. He thus passed forty-eight hours without sleep, in constant exertion, and under considerable moral agitation. On Wednesday he laid by, and feeling unwell, he took on Thursday a saline purge. The medicine operated freely, and on Friday morning, while at the store, he was suddenly seized with vomiting, purging, spasms in the abdomen, and cramps in the legs. Dr. MEIGS passing at the time, was requested to administer his aid. A large sinapism was applied to the abdomen, and the doctor conveyed the patient home in his gig. Dr. Beattie being the family physician, was sent for, and assumed the management of the case. A combination of calomel, camphor, and opium was given, the patient wrapped in blankets, and warmth applied. At 1 o'clock I saw the patient in conjunction with Dr. B. He then presented the following symptoms:—The surface was universally cold, with profuse cold perspiration; the hands shrivelled; the nails purple; the fingers and toes indigo-blue. The pulse was feeble; the circulation on the interior of the lips very languid; the breath and tongue cold; the voice reduced to a whisper; the muscles of the extremities affected with cramps; dejections frequent, discharges a thin, watery, brown-coloured fluid, containing numerous whitish flocculi.

The same treatment was continued, with the addition of frictions made every half hour with an irritating liniment, composed of camphor, Cayenne pepper, mustard, muriatic acid and lard. Immediately after the liniment had been well rubbed on, frictions were made with warm, powdered chalk; dry cups were applied to the abdomen and down the spine.

5 *o'clock, P. M.* The patient much prostrated; coldness of surface increased; a pellucid fluid issuing from every pore; his shirt soaked with perspiration; pulse imperceptible; legs and hands indigo-blue; cramps frequent; labial circulation nearly extinct; the prostration complete; questions annoy him, and he answers with reluctance;

perfect apathy; the warm applications are oppressive to him; dejections not as frequent; no vomiting; thirst intense.

The application of warmth was discontinued, the blankets removed, his wet shirt taken off, and the windows of the room thrown open; pounded ice was given in small quantities, solution of carbon. soda iced was given every few minutes, and frictions continued as before; calomel, camphor, and opium omitted.

10 *P. M.* Patient in same state; surface is dry, though cold; the transpiration has ceased; dejections very small and less frequent. It was thought he could not possibly survive through the night; cold saline drink; ice and frictions persisted in.

Saturday, 25th, 8 o'clock, A. M. Patient alive, though barely animated; no pulse; universally cold; breath cold; voice nearly extinct; labial circulation continues, though very feeble; and the blood pressed from the veins slowly fills them again. *During the night the dejections have been few and small, and the transpiration has entirely ceased.* There have been no additional losses to exhaust the patient further.

Reflecting on the condition of this patient, the vital movements nearly extinct, the circulation almost at a stand, the vital forces reduced to the lowest ebb, we were struck with its resemblance to that which ensues from an exposure to a low temperature. Though the causes are different, yet the condition is very analogous in the two cases. In this state heat and powerful stimulants extinguish, and do not reänimate the vital movements, or if they be roused, it is only a momentary effort, terminating speedily in irremediable exhaustion. We were further struck with another analogy. The choleric patient advanced to the condition of the case before us, with his blood but partially oxygenated, is reduced in the scale of vitality, and approaches in the state and nature of his vital forces to the animals of cold blood, or having a single ventricle. In all such animals, a degree of heat equal to that of the human body is oppressive, benumbing, gives a strong tendency to asphyxia; while a degree of temperature, which is often that developed by fever in the human organism, is productive of fatal asphyxia in the space of a few moments. In those animals also, when placed in mediums destitute of oxygen, if the temperature be elevated, asphyxia is rapidly induced. The same animals in a low temperature, approaching to the freezing point, will survive a very considerable period, and may be reänimated after a much longer suspension of their vital functions.

Acting on these suggestions, I took a piece of ice, and rubbed with it a hand and arm for a minute or two, following it up with dry fric-

tions, first with my hand, and then with a coarse cloth. An instant change took place in the colour of the skin. From a cerulean hue, it became pink, and the sensation of cold was most agreeable to the patient. Encouraged by this experiment, the same process was extended to the whole body, and repeated every half hour. The temperature of the body very soon improved; it acquired an agreeable warmth, and the skin felt dry and more natural. The treatment with ice internally administered, and the iced saline solution given in small quantities every few minutes, was persisted in during the day.

7 P. M. Remains in the same state; a very feeble pulse at the wrist; the labial circulation improved; has occasionally dejections from the bowels, but very small. At this time it was determined to advance a step, and to bring the diffusible stimulants into action. The volatile julep was ordered, each dose containing five grains sub. carbon. ammoniæ. The decoction of rhatany was also administered to restrain the disposition to diarrhœa.

Sunday, August 26th.—Reäction had ensued during the night, moderate in degree; pulse very perceptible at wrist, though feeble; skin of pleasant temperature, and lighter colour; the lips have lost their livid hue, are of a bright red, and their circulation very active; lower extremities warmer; no nausea; dejections very small in quantity and of dark colour; voice is still a whisper; tongue and breath are warmer; circulation through the veins is yet slow. Continue the volatile julep, with the addition of cold wine whey, and dry frictions.

8 *o'clock, P. M.* Reäction had continued slowly to advance during the day; pulse is fuller; head is hotter than other parts of the body; eyes are injected; voice is stronger.

Monday, August 27th.—Cerebral determination; severe head-ache which came on during the night; has his head bound tight with bandage on account of the pain; face is flushed; head hot; eyes blood-shot; pulse has considerable force; voice more natural; tongue furred; nails are dark, but fingers have better colour; skin of fingers is still inelastic and shrivelled, that of hands more natural. Cold applications were directed to be kept to the head; the stimulants were discontinued; twenty leeches applied behind the ears; a laxative enema given, and the feet stimulated with dry heat. The enema produced bilious stools. Sago for diet.

Evening. Head relieved, and convalescence commenced.

From this time the patient, under the charge of Dr. Beattie, continued to improve, and was soon restored to health.

Observations.—I have seen no other patient recover from so pros-

trate and apparently hopeless condition, as the subject of this case. Much is to be attributed in the successful result to the good constitution, and to the regular and temperate habits of the patient. He had produced a state of debility by an impoverished and innutritious diet, adopted from erroneous impressions, and which was incompatible with the exertions to which he was subjected. This probably was a powerful predisponent to the attack he suffered.

The prompt effect of the ice frictions on the colour of the blood, slowly circulating or nearly stagnant in the skin, was remarkable. It was analogous to that which is caused by exposure of the blood to the air or oxygen, and it is blood possessing this colour that alone is adapted to sustain the vital actions, and for the production of the vital forces. Excitation of parts in which black blood circulates is productive of rapid disorganization, or exhaustion of vital activity and death. We have yet much to learn with respect to the influence of temperature on the blood and vital movements.

Case XXXI. *Fourth period; advanced collapse; previous diarrhœa; impoverished diet; death in nine hours from attack; dissection.*

August 15th.—At 7 o'clock in the evening the assistants at the hospital were requested to visit Mary Ann Williams, a coloured woman, residing in a miserable cellar in the vicinity. This woman had lived for some time in great wretchedness, and on scant and innutritious fare. She had been during the day frequently affected with purging and vomiting, but had continued at her wash-tub up to 6 o'clock this afternoon. When seen at seven she was entirely prostrated, and in a state of complete collapse. She was immediately transferred to the hospital. On admission the pulse had ceased; the labial circulation was stagnant; temperature of tongue and breath 90°; complete aphonia; complains of a sense of hunger.

An active stimulant treatment, internal and external, was adopted, and the solution of muriat of soda administered. No effect resulted from the remedies employed—she continued rapidly and steadily to sink, and died at 4 o'clock, A. M.

Examination twelve hours after death.—The lungs collapsed, destitute of blood; accumulation in bronchial vessels, of substance resembling mixture of mucus and saliva; heart natural, containing some fluid black blood.

Cavity of abdomen.—The spleen small and shrunken, no discharge of blood when cut into, presenting a shrivelled appearance. The liver natural; gall-bladder distended with bile. The stomach partially distended with fluid resembling rice water; the mucous coat softer than

natural, and the whole surface covered with enlarged mucous glands, presenting the appearance of white pimples, and varying in size from a mere point, to the size of a millet seed, particularly large and accumulated in great quantities near the œsophagus, and extending from thence along the small curvature of the stomach to the pylorus. There were also on the mucous coat of the stomach pointilated injections and patches of red and mahogany-coloured spots, varying in size from mere points to an inch in diameter, particularly in the large curvature and the vicinity of the pylorus: there was also a white exudation observable near the termination of the œsophagus. The omentum was destitute of fat, and the vessels beautifully injected of a red colour; the vessels of the mesentery were also distended with blood; the mesenteric glands were enlarged, hardened, and of a brighter colour than natural, (pinkish hue.) The intestines contained a large quantity of rice water fluid, or thin glue, of a dirty-white colour, slightly tinged with green, with flocculi floating in it. The vessels of the small intestines distended with blood, presenting an arborescent appearance, imparting a violet tinge to the peritoneal coat, but by dissecting the peritoneal coat it was of a natural colour and consistence, the tinge proceeding from the enlarged vessels in the submucous cellular tissue. No excrementitious matter in large intestines; the muciferous glands much enlarged on internal surface of large intestines and lower portion of the ilium, presenting the appearance of pimples, similar to those seen in Fig. 3, Plate II.; the ducts obvious to the naked eye, with distinct black spot in the centre of the enlarged glands in the lower portion of ileum and near ileo-cœcal valve; the other portions of the large intestines had the same pimpled appearance, but the ducts not obvious.

The cortical portion of the kidneys palid; the bladder contracted and destitute of urine, the internal surface of a light violet colour.

Case XXXII. *Fourth period, suddenly coming on while at work; extreme collapse; pulseless; suspension of the circulation; insensible; evacuations ceased; gradual revival and temporary improvement; partial reäction and death.*

August 23*d.*—Benjamin Shaw, negro, aged sixty years, was brought into hospital at 2 o'clock, P. M. Uses spirits, but is not a drunkard. His wife died with cholera a few days since. Eat yesterday pears and cantelope; was reported to have had yesterday a natural evacuation. This morning went to the meadows in the Neck to mow; had diarrhœa with pain in bowels. While mowing was attacked with great severity, and suddenly fell; had vomiting and purging of

thin clear fluid, and became insensible. In this state was brought into the hospital.

On admission the symptoms were—temperature reduced below natural standard; tongue 90° Fahr. covered with cold moisture; hands shrivelled; skin inelastic; breathing laborious, almost stertorous; insensible; pulse barely perceptible at wrist; circulation of lips arrested; labial mucous membrane livid, its follicle enlarged and projecting; cramps in arms and legs; purging; no vomiting. Sinapisms; frictions, &c.

3 *P. M.* Symptoms more unfavourable; profound coma; no pulse; one passage of rice water fluid since admission; breathing stertorous. Ten cups to epigastrium; injection of saline solution with a few drops of laudanum; frictions constantly made with irritating liniment; dry heat to feet; brandy-toddy as drink. Universal coldness.

6 *o'clock.* Coma complete; cannot be roused; breathing stertorous; cold sweat; no pulse to be distinguished.

His state appearing desperate, and expecting death would soon ensue, treatment was suspended, and he was suffered to lie exposed to the air from a window near his bed during the night.

24*th*, 9 *o'clock*, *A. M.* Condition of the patient ameliorated; during the night the sweating ceased, and the evacuations from the stomach and bowels have been suspended since his admission. Before morning he became quite sensible, and now answers questions; pulse is distinct at the wrist; breathing is less laboured, more natural.

Cups were applied to epigastrium, very little blood obtained; a strong sinapism was applied, and others to the back of the neck and between the shoulders; dry heat to the feet; brandy and water administered occasionally; frictions with irritating liniment; calomel, gr. i., camphor, gr. ii. every hour.

12 *o'clock*, *noon.* Patient remains the same; pulse at wrist; temporal artery distended with blood, but has no pulsation; blood in it can be pressed towards its extremities, but regurgitates, the trunk being secured by pressure; the artery being opened, no blood escaped; ℥i. obtained by applying a cup; blood dark, having no character of arterial blood; tendency to coma, but responds to questions; tongue furred, livid and cold; lips livid, no circulation in them; the bundles of fibres of the pectoral muscles in constant motion, imparting an undulatory movement to the skin, but without the tonic contraction of cramp; no discharges either from stomach, bowels, or bladder. Takes sago water and gum water for drink.

4 *o'clock*, *P. M.* Complains of excessive heat, will not be covered;

throws the covering from him; sinapisms, blisters, nor the frictions have affected the skin; tendency to coma, but can be roused without difficulty, and answers correctly.

6 *o'clock, P. M.* Chest and abdomen have become hot; no evacuations; drinks wine and water; complains of pain in abdomen. Cups applied to the epigastrium, which drew three ounces of blood—it was less viscid and less of tarry consistency than any previously obtained; cups were also applied to the back, and while on the patient made an effort to urinate; some urine he said passed from him; continues diluting drinks, and pills.

10 *o'clock, P. M.* Is much worse; respiration laborious; constant jactitation; great distress; complains severely of the pain and uneasiness in his abdomen. At 12, night, had a discharge from his bowels, and soon after expired.

Dissection. Body examined ten hours after death.—Form athletic; muscles well developed, firm and contracted in limbs; very little adipose substance.

The chest being opened, the lungs collapsed—cut into very little blood escaped from them; ancient adhesions of pleura on right side near the diaphragm; bronchial mucous membrane red and congested with blood, greatest near the bifurcation. The heart of large size, firm; both ventricles contained blood, and the right a polypus concretion.

In the abdomen, the liver presented its more usual colour, a firmness little less than is common, not much blood in its vessels; the gall-bladder distended with bile of natural aspect. The spleen small and shrunken, contained no blood. Omentum without fat—its veins distended. Stomach nearly empty; red patches scattered throughout its internal surface; consistency of mucous membrane natural, not easily torn, thick near the pylorus. The duodenum contained a fluid resembling the arrow-root gruel he had taken; its consistency and appearance not different from its normal mode. The mucous membrane of small intestines for more than half their length deeply injected with blood, and of a port-wine red, containing in them a bloody mucus—the membrane consistent. The vessels distended with coagulated blood. The disseminated follicles or glands of Brunner enlarged. The caput coli more deeply injected, so as to be nearly black; the disseminated follicles also enlarged. In the whole length of the colon the mucous membrane exhibited the same appearance. The membrane was elevated into ridges, forming a resemblance to valvulæ conniventes. At a first glance it might have been supposed to be completely sphacelated, but on examination the consistency of

the membrane was perfect, and the black hue was found to arise from blood effused in the sub-mucous cellular tissue, as it is usually termed by anatomists, but which is properly the derma of the internal dermoid tissue. By dividing the mucous membrane, the coagula of blood could be turned out in solid masses. This phenomenon is the result of interstitial hæmorrhage, and bears the strongest analogy to apoplexy. The pancreas was dry, granulated, and hard. The kidneys firm, and of natural colour; bladder contracted and empty. The blood in arteries and veins similar. Femoral artery diseased, ossified in patches.

The head was not opened.

Observations.—The first periods of the disease, as is usual in his class of individuals, was unattended to by Shaw, and he proceeded to work in the meadows below the city, affected with purging and occasional vomiting. While engaged in the labour of mowing in the hot sun, in this state, he suddenly became exhausted, fell, and passed rapidly into extreme collapse. In this condition he was brought to the hospital. The coma which came on with the collapse is a remarkable feature in this case. It must be attributed as a peculiarity attached to this individual case rather than as belonging to the disease itself. Was it not an accident arising from working in a laborious employment exposed to the sun in his debilitated condition? It is equally remarkable that the coma, after persisting for some hours, disappeared after the cessation of all the evacuations, by the simple recuperative powers of the economy. The phenomenon exhibited by the colic mucous membrane is not peculiar, I met with it in others. The first case was a patient who died in the cholera shed of Montreal, examined by Dr. Harlan and myself. The colon was perfectly black, and the mucous membrane raised into considerable elevations by the effused blood, coagula of which we removed by cutting through the tissue. It occurred in another case in my hospital. In that patient the disease ran on into the typhoid state. The mucous membrane of the colon was black from the blood effused and coagulated in its structure, and from the period he survived, time sufficient had elapsed for the production of extensive ulcerations destroying the tissue.

The appearance of the intestines is represented in Plate II. Fig. 1 is a section of the colon. Fig. 2 a section of the cœcum: and Fig. 3, of the ileum. The plate does not give a perfect representation of the colour. In the natural state the colour was of a deeper black; by the action of the hot press, a brown hue has been imparted, and Fig. 3 has acquired rather too greenish a tint.

CASE XXXIII. *Fourth period; intemperate habits; neglected diarrhœa; collapse complete; no reäction; death in thirty-one hours from attack; dissection.*

September 13th.—Was requested to see, in consultation, J. B. a bricklayer, aged sixty years; has for some years abused the use of ardent liquors; corpulent body; has enjoyed general good health; subject to occasional diarrhœa succeeding to a debauch. For last two days bowels have been disordered, but was attributed to usual cause, and not attended to; eat melons yesterday; last night about twelve was attacked with vomiting, purging, and cramps. Early this morning sent for Dr. M. who took from the arm ℥xv. of blood, and gave salt water emetic and ipecacuanha. He was vomited very freely and copiously by the remedies. The pulse rose, and ℥xv. more blood were drawn; cups applied to the abdomen, and calomel administered. Soon after collapse became complete. I saw him at 3 P. M.; at this time pulse was scarcely perceptible; labial circulation arrested; the body was universally cold, and cold sweat issuing from every pore; tongue cold, furred, and moist; purging frequent, and stools resembling thin gruel; cramps of lower extremities; colour of skin livid; voice feeble; respiration laboured; great precordial distress; sense of extreme debility; thirst incessant; has not vomited since morning. He has taken calomel ℥i., and had injections of acetat. plumbi, gr. xx. with tinct. thebaic.

Frictions were made with an irritating liniment rubbed on with brushes; the calomel continued, and iced saline solution given every few minutes—the last very grateful to the patient; dry heat to the feet; a flannel moistened with aq. ammonia and ol. terebinth. was placed along the spine, and a heated iron passed over it—the skin was instantly inflamed and vesicated. In the course of an hour, no change being induced, the lower and upper extremities were rubbed with ice for a few moments, to which immediately succeeded dry frictions. The colour was changed instantly from a livid to red. In the evening the skin had become dry, the transpiration having ceased, and was warmer; the purging continued without check; the patient gradually sunk, and died early in the morning.

Post mortem examination. Body examined five hours after death.—Muscular; robust body; abdomen swelled and resonant. Thick layer of adeps beneath the skin.

Lungs collapsed when thorax was opened; structure perfectly natural; empty of blood. Heart, right auricle and ventricle distended with blood; no concretions; consistence good; pleura natural; drier

than is common. Large quantity of adipose matter around the heart and in mediastinum.

The intestines externally of deep red, becoming bright scarlet on exposure to air. Peritoneum covering the small intestines red from inflammation, which is deepest where the convolutions are in contact. When the convolutions are separated, numerous filaments resembling cobwebs are formed by a glutinous adhesive matter which is effused on their surface. Numerous fine vessels injected seen through the peritoneum. Fig. 1, Plate II. represents a section of the small intestines, which throughout exhibited the same appearance.

The stomach distended; contained thin, watery fluid in small quantity. The mucous membrane of cardiac extremity of deep red; in great curvature patches of intense red, caused by infiltration of blood into the tissue; stellated patches in pyloric extremity; at this end the membrane appears unusually thick; firm consistency; follicles not apparent. Duodenum light pink colour. Glands of Brunner large and projecting. Mucous membrane of small intestines of bright scarlet, with injected vessels ramifying on it. No. 2, of Plate II. represents a section of the iliac mucous membrane. That of colon approaching to the same, but less intense. Glands of Peyer not visible; those of Brunner like millet seeds. Liver light colour; consistence as usual; very little blood in it. Gall-bladder moderately distended with bile; gall-duct free, probe passing through it with facility. Spleen small and corrugated. Kidneys unaffected. Bladder empty and contracted.

Remarks.—In this case collapse followed soon after the copious depletion which was made. The economy appeared unable to call into operation any recuperative power. No effort towards reäction appeared. The vomiting ceased, and the profuse transpiration was checked in the evening, but the intestinal discharges continued.

The peritoneal inflammation, of which the most undoubted evidences existed in the structure, is an unusual complication. This is the only instance in which I met with it. In all the other cases the serous membranes were remarkably dry, as though the usual serosity lubricating their surfaces had been deficient. The intestinal mucous membrane was also, in this instance, more intensely red and inflamed than in any other case I have witnessed. The inflammation appeared to have been of the erythemoid character, being uniformly diffused, and affecting the vascular tissue principally. The follicles were not enlarged as they are seen in most cases of cholera, exhibiting the appearance of an eruptive disease of the intestinal mucous membrane. This state of the mucous follicles, such as I have met with it in thir-

teen out of fifteen cases of cholera, is shown in Fig. 3, Plate II. The distinct follicles, (glands of Brunner,) are seen enlarged, presenting the character of pimples. Very frequently the opening of the ducts is to be perceived having the appearance of a dark spot on the apex of the enlarged gland. In Fig. 3, towards the lower edge, is also seen a patch of the aggregated follicles, (glands of Peyer,) tumid, enlarged, and elevated above the general surface of the intestine. This specimen was taken from a female who died from a violent attack of cholera of a few hours continuance. A similar enlargement of the follicles is very common in the superior portions of the small intestines and lower portions of the colon, in the disease so generally termed typhus in this country, (follicular enteritis.) In the ileo-cœcal portion of the intestines, the principal location of the disease, the glands of Brunner and of Peyer are destroyed by ulceration, which often involves the whole of the surrounding mucous membrane. Receding from this point in either direction, the follicles are less affected, until they are seen as in the plate, simply enlarged. In those patients that escaped from the collapse of cholera, and in whom typhoid symptoms supervened, under which they have succumbed, I found precisely the same condition of ulceration in the ileo-cœcal region that we are accustomed to meet with in the Alms-house patients who die of typhus fever.

Pathology.—From the phenomena attending the third and fourth periods of cholera, as illustrated by the preceding cases, its pathology may be determined, it appears to me, by the application of physiological principles with perfect perspicuity. The leading features unquestionably are, 1st, the failure or cessation of the circulation both general or vascular, and capillary or organic; and 2d, an alteration in the quality or deterioration of the constitution of the blood. These phenomena or conditions of the economy are engrafted on or superadded to those of the first and second periods. The constant penetration of the tissues and organs by arterial, oxygenated, or scarlet blood, is an essential condition of vital activity. Whenever the quantity of blood, which is a constituent element of every living organ, is reduced below its normal amount in an organ, or the blood is changed in its constitution, the vitality of that organ is diminished, or it perishes. The skin, inelastic and shrivelled, the sunken features, the pulse feeble or vanished, the veins and arteries when opened empty of blood, or that fluid escaping in a small and feeble stream without jet; the blood immoveable by pressure in the tissue of the lips and gums, and in the hands, feet, fingers, and toes, are all con-

clusive evidences of this diminished amount of the fluids circulating in and permeating the vascular system, and the tissues of the organs. The cerulean, livid, and plumbaginous hue of the extremities, often of the whole body, and of the internal tissues, the blood taken from the arteries scarcely differing from that in the veins, are equally conclusive as to the profound alteration the blood has undergone, and the almost entire absence of oxygenated, arterial, or vital fluid in the economy.

In the third and fourth periods of cholera we have then existing as its peculiar pathology, 1st, the extensive irritation of the alimentary mucous membrane, and consequent determination and accumulation of blood in that tissue, which are the primitive pathological condition of the first and second periods; 2d, the exhaustion and prostration of the vital forces and vital activity, resulting from the cessation of the circulatory movements and stagnant state of the capillary or organic circulation.

Whence arises, is the next question that presents itself, this enfeebled condition of the circulating powers? What has produced this exhaustion, and even abolition of the circulation of the fluids, and consequent overthrow of the functions on which the vitality of the organism depends?

The explanation of these phenomena is resolvable in two methods. The first is loss of power in the nervous system: this is a very common supposition. It is a necessary consequence of the hypothesis, that the capacity of an organ to act depends on its nerves, at best a problematical conjecture, and that this power in the heart is derived from the spinal marrow, a doctrine supposed to have been established by Le Gallois. The errors of this experimenter have been so clearly exposed, and his conclusions so completely invalidated, that it is a matter of surprise the opinion he advocated should continue to be reproduced. The facts of the disease give no countenance to this supposition. In the first periods there are no evidences of enfeeblement of nervous power. On the contrary, the cramps of the voluntary muscles, and the spasms of the muscular tunic of the alimentary canal, are direct indications of an opposite condition—they indicate excitement and augmented energy of the nervous stimulations exciting the muscular organs. The muscular power of patients in this disease is remarkable, considering its great intensity. They are often seen to walk into the hospitals, when without pulse and a short period previous to dissolution. When the circulation is too feeble to be longer perceptible, they still enjoy great muscular energy, move about without difficulty, assist themselves, sit up, or even rise from bed, and often do these a few moments before they expire. There

is no evidence that the failure of the action of the heart, and of the stagnant state of the organic circulation, are attributable to a deficiency of nervous energy. It is mere conjecture.

The insufficiency of the first explanation is palpable, and we must resort to the more direct, obvious, and quite adequate cause, found in the exhaustion and alteration of the circulating fluids by the excessive evacuations from the stomach, bowels and skin. In the analysis of the blood contained in the first part of this essay, the larger portion is seen to consist of water holding in solution a variety of saline principles. The irritation of the alimentary mucous membrane, or properly, parenchyma, being secretory in its effects, throws off these elements, and the discharges being large in amount, and rapidly induced, the excessive drainage exhausts the blood. It is then no longer sufficient in quantity to fill up the vascular and angeal apparatus. Shrinking and shrivelling, first of the remoter tissues, capillaries, and vessels, ensue; the blood no longer filling the calibre of the arteries, the pulse disappears, and the heart, losing its accustomed stimulation, acts with diminished energy. The rapid and excessive evacuations of cholera produce, as it respects *the volume and force of the circulation*, precisely the same results as profuse hæmorrhage; and between a choleric patient in collapse and one exhausted by hæmorrhage, many points of resemblance prevail. By the drainage of so large a portion of the aqueous element of the blood, this fluid acquires a viscidity greater than is natural, approaching to the consistency of molasses or tar, which becomes a further impediment to its circulation. The water of the blood is the vehicle or medium which suspends the solid elements, the globules and hematozine, and carries or distributes them through the vessels and tissues. The diminution of this element to a certain extent, by impairing the fluidity of the blood, is alone adequate to arrest the circulation—to produce its accumulation in the right cavities of the heart, of consequence in the venous apparatus emptying into them, and its stagnation in the capillary or angeal tissue of the organs. This deficiency of the aqueous portion of the blood is not a mere conjecture, or inference drawn from the amount of evacuation. It is a fact sustained by positive proof. Repeated analyses of the blood of choleric patients establish the fact, that the serous fluids, the water and saline principles, are much less than in healthy blood, and the quantity of hematozine is proportionally augmented. The chemical examination of the fluid evacuated from the bowels, concurs to the establishment of the same fact. It bears a strong analogy to the serum of the blood, consisting of the saline principles of the blood and albumen, held in solution by water. We have thus an explanation direct, palpable, demonstrated, and

perfectly adequate to the production of the phenomenon, whose solution is sought for. The extreme debilitation of the heart and cessation of the circulation, are to be attributed to exhaustion of the circulating vital fluid, and to its viscidity depriving it of the power of mobility.

The deterioration of the blood, the absence of arterial blood, or the proper vital sanguine fluid, is accounted for from the operation of the above cause. It is now a settled fact, that the air or oxygen does not redden the colouring matter of the blood, except through the medium of the serum, and consequently as this is abstracted from the blood, the influence of the air on that fluid in the function of respiration is enfeebled or entirely lost. Hence the blood is but partially oxygenated; the difference between the arterial and venous blood is nearly or quite imperceptible. The consequence of this state of the circulating fluid is the reduction to the lowest ebb of the vital forces, of vital activity, and of the vital organic movements, for which the presence of arterial blood in the tissues, is an essential circumstance.

From these facts can now be understood the incapacity of the economy to take on reäction, either from its own recuperative operations, as in ordinary febrile diseases, or by the artificial resources of our profession. For the production of reäction, which is the irradiation or diffusion of a local excitement or irritation, vital power is necessary. The vital forces must possess energy, vital activity be fully developed, the sympathies or nervous connexions of the organs in full action, and the tissues receive the augmented supplies of arterial or vital fluid necessary to the development and maintenance of the excitation induced. None of these requisites are present in the collapsed state of cholera, and hence necessarily proceeds the difficulty and often impossibility of reäction.

A confirmation of these views is derived from the effects produced by the injection of water, or a weak saline solution into the veins. In most instances a speedy reänimation is produced—the pulse returns, the temperature revives, the præcordial distress is relieved, and for a period the patient appears perfectly restored. The mere addition of water to the blood, by rendering it again fluid, restores the circulation, and renews the functions of the organs. But this process does not remove the original cause, the secretions and evacuations continuing, the previous exhaustion is reproduced. Venous injection is a mere palliative of one of the consequences or effects of the primitive affection, and if that be not removed, it is only temporary in its action. Justice has not been done to this remedy. During its employment, means have been resorted to at the same time—powerful stimulants, heated vapour, hot baths, active purgatives, large doses

of narcotics and stimulants, which have counteracted the beneficial effects of the injection in reäwakening the circulation.

Treatment.—Adopting the above pathological views of the proximate causes of the fourth period, or state of collapse, the indications of treatment become well defined. They are, 1st, to arrest the inordinate evacuations emptying the vessels, enfeebling the heart, and exhausting the circulation through the stomach, bowels, and skin. 2d. To restore the wasted fluids by giving to the patients constantly drinks of various kinds, and administering aqueous enema intended to remain in the bowels. 3d. To continue the treatment calculated for the first periods of the disease, which is to allay the extensive irritation of the alimentary mucous membrane. 4th. To quiet the irritation of the nervous system causing spasms and cramps: and 5th. To produce as early as possible diffusion or reäction.

The first of these indications is fulfilled in different manners. The safest, in the cases of the temperate and robust, is the direct antiphlogistic treatment. This consists in allaying the vomiting by the effervescing draught; iced carbonated water; small pieces of ice constantly held in the mouth; leeches or cups to the epigastrium and abdomen. General depletion when collapse is threatened is highly dangerous. It is admissible only in the first periods and in robust individuals, especially of the sanguine temperament. When the circulation is already enfeebled and failing, the abstraction of blood from the emptied vessels is a measure calculated to insure exhaustion, the proximate cause of the collapse. Subsequent to the employment of these, or at the same time, lime water and milk may be administered every hour. When spasms exist, opiates in small doses, and camphorated water, are demanded, and are often useful. Calomel in the dose of gr. ss. to gr. i. with acetat. plumbi, gr. i. given every hour or half hour will succeed in some instances.

The same end is attained by an opposite method, and is best adapted to those who are threatened with rapid exhaustion. It is not as safe in the more robust individuals, and must not be persisted in for too long a period. This method consists in direct or immediate revulsion, converting the secretory irritation of the alimentary mucous membrane into a higher grade of action or inflammatory irritation, and thus arresting the evacuations. In this manner do the mustard and brine emetics operate, as also ipecacuanha, and some of the stimulant and irritating cathartics employed. Calomel in large doses, by changing the mode of irritation, will accomplish often the same end. When the evacuations have been controlled by the remedies of this character, a new danger ensues. The patient has to encounter the hazards of a gastritis and enteritis, with a febrile reäction having

those local affections for its basis, and attended often with secondary sympathetic determinations to other organs of great intensity. The excitant, direct revulsive treatment must be immediately abandoned when the signs of these appear, and the antiphlogistic substituted in an appropriate manner.

The cutaneous transpiration proves exceedingly exhausting to the patient, and is of itself sufficient often to bring on collapse. It should never be excited by surrounding the patient in blankets, or enveloping him in warm vapour. Prior to our own experience of the disease in this city, and relying on European statements, the sanitary committee, acting on the advice of the Consulting Medical Board, made most ample provision of various heating apparatus, steam baths, stomach warmers, or other similar means. All the bedsteads of the hospitals were adapted for the use of steam, and in the management of the first cases these means were assiduously employed. No patient under this treatment survived over from four to six hours, although some had strength sufficient to walk into the hospital. Heat was most distressing to the patients, who resisted its application, and protested often vehemently against its employment. It must be confessed, that the prejudices and excitement of the public against the hospitals in the commencement of the epidemic were not without foundation. This method was soon abandoned. The patient succumbs the more rapidly in proportion to the profuseness of the transpiration. It is best checked by cool air, frictions made with cloths dipped in iced water, or with ice itself, followed up immediately with dry frictions. Frictions with actively irritating liniments, with dry chalk, and similar measures, were found often effectual in arresting the cutaneous discharge.

The evacuations from the bowels are best restrained by small doses of opiates, or the same given in enema, either of simple water, mucilage, or saline solution. In some cases astringents are useful. I prefer of this class the rhatania.

The second indication is obtained by administering freely of drinks and liquids to the patient While the stomach is very irritable, and the thirst intense, ice, iced water, iced Seltzer water, or carbonated water, are the most grateful to the patient, and the most frequently successful means. In persons who have been addicted to the excessive use of ardent spirits, some stimulus is often required, as small portions of brandy, wine, or carbon. ammoniæ, aq. ammonia, or others of this class. The weak animal broths, as chicken, mutton or veal water, were found very useful. Gum, rice, and barley water were advantageous, as allaying irritation, affording light nutriment, and replenishing the circulation.

The third indication is fulfilled by the same means recommended

for the first and second. They allay irritation, and it is by that operation they arrest the vomiting and the profuse, exhausting secretions and evacuations. When the direct revulsive treatment is followed with a view to suppress the evacuations, as soon as that object is accomplished, the remedies must be cautiously employed, or entirely withdrawn; as then, they oppose the obtaining of this indication. Small doses of opium and calomel, or opium, calomel and ipecacuanha are adapted to this end—together with opiate enema.

The last indication can never be obtained until the evacuations have either entirely ceased, or are very considerably diminished. At least, such is the result of my observations. While they continue, and the circulation, general and organic, is reduced to a low ebb, and the vital forces in all the organs nearly extinct, diffusion or irradiation of excitement cannot be accomplished. For this purpose, mobility of the organic fluids, (the fluids of the capillaries,) is indispensable.

The most effectual means are cutaneous revellents, and the safest direction to give the excitement is to the skin. Frictions, dry, or made with irritating liniment, sinapisms and blisters to the abdomen and extremities, by exciting the cutaneous tissues, are the most efficient means of rousing the dormant forces, and of inviting the excitement from the internal surfaces to the exterior. The diffusible stimulants may be brought into action with this intention in many cases. The best, most certain, and safest mode of employing them, is in minute doses frequently reiterated. In this manner their absorption and diffused action is procured, while their local excitation is to a great extent obviated.

Vigilance is required in watching the reawakening of the forces, and the production of reäction. It is not uncommon for it to occur in a single organ with great rapidity, and to occasion a fatal result. Apoplectic symptoms in this manner are often the immediate cause of death. In one case to which I was invited in consultation, a suffocating catarrh in one lung, with pneumonia in the other, were developed in the reäction, and destroyed the patient in a few hours, from the termination of the collapse.

The fourth period, or confirmed concentration and collapse, when completely established, must necessarily prove fatal in the great majority of cases. It is a moribund state. No method of treatment can be more than partially—very partially successful. The great object should be to prevent the disease from arriving at this period. The best system of treatment is that under which, in any given number of cases, the fewest reach this stage. The mortality of the disease is then inconsiderable. When collapse has been induced, the results

of different methods will not vary to any great extent. No one can boast of more than few and scattered triumphs. The mass will and must perish. The vital lesions are too considerable, and vital functions too profoundly disabled to be restored with certainty by any human means.

It is an argument used by some, that because the patient is in a most critical and dangerous position, that, therefore, violent treatment and powerful remedies must be resorted to. This arises from the employment of figurative language and the personification of disease. The disease is a giant, and pigmy remedies cannot overthrow it. Such or similar expressions are employed. But the disease is nothing separate, nothing distinct from the organs. It is a modification, and effects arising from the modification of the organs. Remedies cannot influence disease independent of the structure. They are modifiers of the vital activity and movements of the tissues. When the vital forces are prostrated to the exceedingly low ebb, they are seen to be in the period of collapse, the vital movements in the tissues nearly extinct, and the vital functions reduced to their lowest state, is there not a greater probability that violent—energetic treatment so called—and excessively perturbating remedies, will extinguish the feeble remains of life, rather than recall them to their wonted activity? This has been my impression, and such I believe the evidence afforded by my opportunities of observation.

The fifth period of the disease will not require more than a mere allusion to its character. It consists in the general febrile reäction that occasionally ensues in those who escape from the fourth period, or confirmed collapse. It assumes all the characters of typhoid fever—it cannot be distinguished from the common cases of that disease. In the fatal cases, I observed precisely the same anatomical lesions as in that disease—intense inflammation, and extensive ulceration of the glands, both of Peyer and Brunner, of the mucous membrane of the ileum and colon, with accidental lesions in the brain, in the stomach and other organs, but which are not uniform and constant.

We will conclude our remarks with the following tabular statements of cases of cholera epidemica in Hospital No. 5, Public School House, corner of Sixth and Lombard streets, under my charge as Physician-in-Chief, having as Assistant Physicians, Drs. Turnpenny, Whelan, H. Tucker, Barabino and Staples.

The hospital opened July 28th, and closed September 1st, a period of thirty-four days—number of patients treated, 69—average treatment of each patient two days and a fraction.

Number of admissions, 69—deaths, 20—deaths within twenty-four hours after admission, 14.

Table of Cases and Results arranged in Periods of the Disease.

	Incipient Irritation, First Period.	Confirmed Irritation, Second Period.	Incipient Concentration and Collapse, Third Period.	Confirmed Concentration and Collapse.
	5	21	14	20
Recovered	5	21	13	1
Died	0	0	1*	19

Table of Ages of the above Patients.

			Deaths
Under 10 years	4		0
From 10 to 20	6		3
20 to 30	25		6
30 to 40	18		5
40 to 50	7		2
50 to 60	7		3
60 to 70	2		1
	69		20

Table of Sexes and Colour.

		Deaths
White Males	15	3
Females	12	2
Whites	27	5
Black Males	17	8
Females	25	7
Blacks	42	15

Males 32—Females 37—Total 69.

Of the above patients there were,—Intemperate, 33—Temperate, 14—Unknown, 22—Total 69.

There existed preliminary symptoms in 34—Total absence in 4—Uncertain, 31—Total 69.

Tabular View of Symptoms in the above Sixty-nine Patients.

Vomiting.	Purging.	Cramps.	Abdominal Pain.	Shrivelled Extremities.	Cold Tongue and Surface.	Livid or Blue, (Whites.)
49	59	42	34	25	37	13

In private practice I attended 55 patients, of which the following table presents the periods and results.

	First Period.	Second Period.	Third Period.	Fourth Period.	Totals.
Number of Patients	26	23	5	1	55
Recovered	26	23	5	0	54
Died	0	0	0	1†	1

* Passed into fifth period, and died of typhus fourteen days after admission.

† Died in six hours from attack.

Numerical Table of Symptoms in Fifty-five Patients of Private Practice.

Nausea.	Vomiting.	Diarrhœa.	Cramps.	Pain in Abdomen.	Excessive Thirst.	Cold Surface.	Feeble Pulse.	Blue Extremities.	Collapse Complete.
36	37	49	20	48	16	14	14	3	1

Whole number of days of attendance 143—average treatment of each patient, 2⅔ days.

Table of Cases attended in consultation after the treatment had been commenced.

	Second Period.	Third Period.	Fourth Period.	Total.
Number of Patients -	2	1	5	8
Recovered - - -	2	1	1	4
Died - - - -	0	0	4	4

Numerical Table of Symptoms in above Cases.

Vomiting.	Diarrhœa.	Cramps.	Pain in Abdomen.	Anhelose.	Cold surface and tongue.	Blue.	Cold sweat.	Complete collapse.	Died within 24 hours.
7	7	7	8	7	6	5	5	5	3

ART. V. *Extirpation of a Tuberculated Sarcoma, from the Neck.* By VALENTINE MOTT, M. D., Professor of Operative Surgery in the College of Physicians and Surgeons of New York.

IN the month of February, 1832, Miss ——, aged nineteen, came from the country, for the purpose of consulting me about a tumour situated in the neck.

She stated, that it had been growing about five years, and as it inconvenienced her very much from its great size, she was desirous of having it removed. It had never been painful, and her general health had been in no way affected.

As it was still increasing in size, I fixed on an early day for the operation, and performed it in the following manner.

An incision was made, in the direction of the inner edge of the sterno-mastoid muscle, from the occiput to the clavicle, and another from about the middle of the first, obliquely over the most projecting part of the tumour, to the top of

the shoulder. Upon cutting through the platisma, the sterno-mastoid was found expanded over the tumour in its whole course, and not thicker than the first named muscle. In order to facilitate the subsequent steps of the operation, its fibres were divided in the direction of the second incision. The deep fascia of the neck was next cut through, and the cellular investments removed until the lobular form of the disease fully presented itself to view.

It was next separated from the clavicle, sterno-hyoid muscle, sheath of the vessels, scalenus anticus, and omo-hyoid muscles, and turned upwards and backwards. On arriving opposite the os hyoides a portion was found to pass under the digastric muscle and styloid process, pushing up the parotid gland, and another to extend forwards, resting on the pharynx. That which passed under the styloid process, so surrounded the deep jugular and internal carotid artery, that they seemed to pass through the tumour.

In order to remove these portions with more safety, it was deemed expedient to remove the mass of the disease by cutting through it at this point. The flow of blood from every incision into its substance was surprisingly profuse, (much more so, than in any malignant tumour I have ever encountered,) and I immediately directed firm pressure to be made with a sponge, and tied the carotid artery a little below the thyroid cartilage. I was now enabled, although it still bled profusely at every stroke of the knife, to complete the subsequent steps of the operation.

Every part of the tumour was removed, with the exception of that portion involving the jugular vein, the principal part of which was drawn down and embraced in a ligature. The external jugular, external carotid, and a number of arteries, were tied. The wound was brought together by several stitches; and adhesive straps, lint, compress, and roller, completed the dressings.

An antiphlogistic treatment was pursued until suppuration was established. The wound healed readily; the ligatures from the carotid, and from the small portion of the tumour, separated in regular order, and the patient returned home in about four weeks. She has since married, and continues perfectly well.

New York, 25 Park Place, March 16th, 1833.

REVIEWS.

ART. VI. *Physiologie des Menschen*, von FRIEDERICK TIEDEMANN, Lehrer der Anatomie und Physiologie an der Universität zu Heidelburg. Erster Band. Allgemeine Betrachtungen der Organischen Körpern. pp. 719. Darmstadt, 1830.

Traité Complet de Physiologie de l'Homme. Par FRED. TIEDEMANN, Professeur d'Anatomie et de Physiologie à l'Université de Heidelberg. Traduit de l'Allemand; par A. J. L. JOURDAN, D. M. P. Première et deuxième partie.—*Physiologie Générale et Comparée.* Paris, 1831. pp. 798. 8vo.

Human Physiology. By FRED. TIEDEMANN, &c. Vol. I.—*General Observations in Relation to Organized Bodies.*

THE subject of physiology has of late years acquired an interest with the profession and the public, which it did not previously possess. It may, indeed, be esteemed a new science; for valuable as was the information concerning the functions of the frame contained in the writings of HALLER, LIEUTAUD, HAMBERGER, LUDWIG, BARTHEZ, CULLEN, METZGER, CALDANI, and other distinguished investigators of the animal economy, it too frequently happened that their deductions had but a slender basis, and that instead of trusting largely to experiment, their descriptions of the functions were greatly indebted to the imagination; and far removed from the precision that characterizes the physiology of the present period.

Notwithstanding, however, all the improvements in the science, much is unfortunately still left in doubt and conjecture. Most of the operations of the frame are executed in the very tissue of the organs, and consequently in parts which are too molecular to admit of observation, even when vision is aided by the most powerful optical instruments; and our knowledge is too frequently limited to the fact, that a function is executed in a particular organ, without our having the slightest conception of the mysterious agency which accomplishes it. We know positively that the salivary glands secrete the saliva. We see organs possessed of a peculiar formation; having arterial trunks distributed in their tissue, until the final ramifications can no longer be detected; and possessing a distinct set of vessels, whose origin equally escapes detection, and which contain a fluid differing essentially in

properties from the blood of the artery. If we extend our observation to the most minute perceptible branches of the artery, we find arterial blood within them, whilst in the smallest ramification of the other set of vessels the peculiar fluid is always distinguishable. We are led, therefore, to the conclusion, that between the termination of the artery and the radicles of the excretory ducts, as these vessels have been termed, an action of separation and of elaboration has been effected, by which a new fluid has been formed; in other words, that the gland is the organ for the secretion of the saliva. But although this is evident, the intimate nature of the operation that accomplishes it is totally inappreciable. Careful observation and reflexion inform us, however, that the gland must be in a certain condition in order that the function may be properly effected. The arterial blood must be distributed to it in due quantity and force; the capillary vessel, by which the secretion is probably effected, must be free from irritation, and there must be no obstruction of the duct which conveys the product of the secretion to the proper outlet. We thus learn the laws that govern the physiological operation, although we may still be profoundly ignorant of the precise mode in which it is accomplished. Analogous to this is our want of knowledge of certain imponderable agents, which astonish us by their effects in physics. The nature of the electric and magnetic fluids, in their various modifications, and of the powerful force by which bodies, as well as their molecules, are attracted towards each other, is as mysterious and as unknown as the force of life; yet by observation and reflexion we succeed in attaining an acquaintance with the laws that govern these singular agents, and a wise theory enables us to construct various instruments, which, by acting in accordance with those laws, are of the most signal value to man. By one of these—the mariner's compass—voyages across the trackless ocean are conducted with a precision, which, prior to an acquaintance with the laws of terrestrial magnetism, must have been altogether wanting.

The great object of physiology is to fathom the laws by which the vital principle effects the various phenomena of the living machine; and to detect the material condition by which these phenomena are modified consistently with health; whilst the attention of the pathologist is directed to the material conditions which derange the machine, and to the indications that announce such derangement. Pathology is, consequently, the kindred branch of physiology; the mode of investigation is alike in both; and hence the term 'diseased physiology,' which has been given to the former by some physiologists.

It has been wisely remarked by a writer on medical education, in

a recent number of the *London Journal of Education*, in an article not distinguished, however, for much profoundness or originality of sentiment, as somewhat singular, that the interesting and important department of anthropology, which forms the subject of the work before us, should so generally have been looked upon as subordinate to anatomy, and incorporated with that laborious branch of medical science in the same professorship. Nothing can, indeed, be more discrepant than the two studies, if the chair should embrace descriptive anatomy only, as has generally been the case. Whilst the one only requires, like every other branch of science which is merely descriptive, a certain degree of attention, and a requisite memory, the other is physico-moral in its mode of investigation, demanding a competent knowledge of descriptive anatomy, and of the higher branch of general anatomy—the study of which is of comparatively modern introduction—as well as of the different collateral sciences, which throw so much light upon most of the physiological operations—as natural history, chemistry, physics, &c.

Owing, however, to the rapid strides made by anatomical science within the last forty or fifty years, it is rare to meet with a teacher whose knowledge is limited to descriptive anatomy. Since the time of Bichat, anatomy has been considered to include more than the dry detail of bones, muscles, ligaments, vessels, and nerves, pushed to a degree of needless minuteness, and crowding the memory of the student with a tedious list of names to be speedily forgotten, but unfortunately with the effect of diverting him from the more useful parts of his profession, and accustoming him to exercise his verbal memory instead of inciting him to reflexion. The anatomist now occupies himself, in addition, with the structure, texture, and arrangement of the different organs and apparatuses, and their various correlations, and endeavours to penetrate into the origin and formation of the human body, the character of its constituents, and the changes that supervene in the different stages of existence.

On all these topics the physiologist has likewise to be instructed. Although the most intimate acquaintance with the structure of an organ or apparatus of organs may not teach him the function executed by it, the function cannot be deduced without a certain degree of anatomical knowledge of the parts concerned in its production. Haller has termed physiology, not inappropriately, *anatome animata;* and in most of the works on physiology, the study of the structure has been combined with that of the function.

The numerous topics of anthropology, comprised under the head of *physiology*, have been well detailed by M. Tiedemann. They indi-

cate how vast must be the study if extended to the utmost limits of which it is capable. In the preface to the excellent, but diffuse '*Elementa*' of Haller, consisting of eight volumes, quarto, he asserts that he has only embraced the first lines, as it were; and if we are to judge by the portion of the "*Physiology of Man*" of M. Tiedemann which has appeared, its extent can scarcely be less than the *Elementa* of his distinguished countryman—for so he may be considered.

In the Introduction to the work before us, M. Tiedemann makes some pertinent comments on the method of studying physiology—the foundations of which he properly considers—as in the case of physics in all its ramifications—to be observation and induction.

"To observe and experiment," he remarks, "we at times employ the senses, as nature has provided them, and at others add the assistance of different instruments. In the latter case, it is of importance to be certain of the goodness of the instruments we select, and to know how to use them. Without these two conditions we run the risk of observing incorrectly. The following rules are essential for any one who professes to be an observer. 1st. Above all it is important that the senses should be in a perfectly healthy and regular condition. The best manner of testing this is to make observations simultaneously with other persons. It is moreover necessary to know how to detect and avoid illusions and hallucinations of the senses. 2dly. Another indispensable qualification for a good observer, is to be able to direct his cool and prolonged attention entirely to the object of his observation. This is the only way to observe with certainty and perseverance, and to suffer nothing to escape. A taste for observing and experience communicate this degree of attention. 3dly. The observer should divest himself, during his researches, of every opinion he may have previously embraced, as this is a source of the gravest errors. A partial observer finds whatever flatters his favourite theory, and omits whatever is opposed to it. This it is which has frequently rendered the philosophical systems of physics dangerous. History instructs us that physiology and medicine, in particular, have more than once had reason to repent the indiscreet application of principles admitted by a dominant school. Every kind of mental prepossession is injurious to correct observation. When we begin to observe, theory must be forgotten, except when we are desirous of submitting theoretical ideas themselves to the crucible of observation. No theory should be esteemed correct and valid, unless it has been deduced from observation, and afterwards confirmed by fresh observation. 4thly, and lastly. The observer and experimenter should be animated by the love of truth. Truth should be his sole aim, without troubling himself whether his observations and experiments may confirm or refute opinions admitted by him or by others. Let him never forget the maxim of the great Haller:—*Boni viri nullam oportet causam esse, præter veritatem.*

"The errors which not unfrequently occur in observing or experimenting, are owing to simple ideas being taking for observations, and consequently to observing badly, and affixing to the objects a product of the imagination. On the other hand, too little attention is paid to the contemplation of objects; they are not examined with sufficient care, and accordingly a superficial acquaint-

ance with them is alone attained. These two faults influence the judgment we form of objects: in the former case something extraneous is added, and in the latter something essential is neglected. The two faults may also be combined, and induce error. They can only be avoided by conforming to the precepts traced above, and by frequently repeating unprejudicedly our observations and experiments.

"As regards observations to be made with the internal sense, they present considerable difficulties. Tranquillity and presence of mind are especially requisite in every delicate internal observation instituted on ourselves. KANT properly remarks on this subject—'Either there is nothing extraordinary passing within us, and therefore nothing to observe, or we experience internally an extraordinary emotion, and in such case we are rarely sufficiently masters of ourselves to be able to observe calmly.'" p. 13.

It is obviously impracticable to arrive at any satisfactory results regarding the play of the human living machine so far as concerns the internal organs. Vivisections are inadmissible, and the only opportunities afforded us for observation are when any extensive wound exposes the larger cavities. The physiologist is hence compelled to study the living machine on animals, either whilst alive, or immediately after they have been killed. It is in this way that much of the knowledge we possess, regarding the functions of living organs, has been obtained; and although it has been fashionable to employ much mawkish sensibility in stigmatizing the vivisections of the physiologists and toxicologists, of continental Europe more especially, we are indebted to them for large additions to our physiological knowledge, as well as to our stock of agents for depriving some of the most deadly poisons of their terrors.

One of the most distinguished of these experimenters is the celebrated chemist ORFILA, to whose researches more animals have probably fallen victims than to those of any other individual, yet if no other result had followed his vivisections, than the discovery of the effect of albumen in rendering corrosive sublimate innocuous, the reward would have far exceeded the sacrifice. To this discovery the distinguished chemist, THENARD, is indebted for his useful life. Whilst engaged in lecturing to his class, he sipped from a glass, by mistake, a sufficient quantity of corrosive sublimate to have destroyed him, but having the white of egg at hand, he quickly swallowed it, and sustained no inconvenience.

Wanton experiments on living animals, in the hands of ignorance and cruelty, cannot be too strongly deprecated; whilst those that are instituted by the judicious physiologist, with as little suffering as is compatible, are not only justifiable but laudable. Fortunately it happens that, in the present state of the science, the experiments on

many points, are so numerous and diversified, that the only difficulty is to deduce accurate inferences from them. Other points require fresh experiments, which may still, however, leave them in obscurity, as the intimate phenomena of vitality are too molecular and enigmatical to admit of the expectation that they will ever be unfolded.

"The services," says our author, "which Harvey, Haller, Fontana, Spallanzani, and others, have rendered, by their experiments, are duly appreciated by all true physiologists. If man does not hesitate to kill so many animals, at times in the most cruel manner, to satisfy his necessities or his pleasures, how much less can we blame experiments on living animals, which have no other aim than the extension of our knowledge, and at the same time the good of our fellow men, as the information attained in this manner, concerning the manifestations of life, has numerous applications to medicine? To refer to a few examples only;—all that we know regarding the cicatrization of wounds; the obliteration of arteries after ligature; the enlargement that occurs in the vessels collateral to a principal trunk; and on the action of poisons and the appropriate antidotes, is the result of a multitude of experiments made on living animals. It is infinitely more conscientious to rectify and augment in this manner our knowledge of life, than to experiment on the sick, guided by imperfect systems which are frequently the mere offsprings of the imagination. The intimate conviction, indeed, of the great value of physiology, as a solid basis of rational medicine, has, in all times, impelled men of genius to have recourse to experiments on living animals to elucidate the history of the functions of the human frame. All the irrefutable facts that human physiology possesses, touching the knowledge of the different functions of respiration, circulation, digestion, absorption, and muscular and nervous irritability, are almost wholly the result of experiments on living animals, from which, by analogy, conclusions have been deduced applicable to man." p. 15.

It is, however, in the deduction of proper inferences from experiments on animals, and in their application to man, that the great difficulty exists. Too little attention is often paid to the deranging influences caused by the excessive irritation of the nervous system, induced by operations frequently of a most painful kind; whilst the results of experiments on the lower animals, which differ so essentially from man in organization and function, have been too often, and without due reflexion, transferred to him. It is obvious that analogy can only be justly invoked, when the subjects of the experiments belong to the higher classes of animals; and even here we occasionally meet with singular anomalies. In some experiments, instituted by Magendie, for the purpose of discovering the encephalic seat of the motive forces, he found that the cerebral hemispheres might be cut deeply in different parts of their upper surface, without any evident alteration in the movements. Even their total abstraction,

if it did not implicate the corpora striata, he found to produce no greater effect, or at least none but what might be easily referred to the suffering induced by such an experiment. But the results were by no means alike in all the classes of vertebrated animals. Those detailed were observed on quadrupeds, and particularly on dogs, cats, rabbits, Guinea pigs, hedge-hogs, and squirrels. In birds, the removal or destruction of the hemispheres was often followed by stupor and immobility, but in numerous cases they ran, leaped, and swam afterwards: and in reptiles and fish the loss of the hemispheres seemed to exert but little effect upon their motions. Again, the frog will continue sitting, apparently unconcerned, for hours after it has been eviscerated; the tortoise walks about after losing its head; and the polypus, when divided by the knife, forms so many separate animals. If the head of a wasp be severed from the body, the head will attempt to bite, and for a considerable time the abdomen will try to sting. Dr. Harlan cut off the head of a rattlesnake, and grasping the part of the neck attached to the head with his finger and thumb, the head twisted itself violently, and endeavoured to strike him with the fangs. A live rabbit was afterwards presented to the head, which immediately plunged its fangs deep into the rabbit; and when the tail was laid hold of, the headless neck bent itself quickly round as if to strike him.* These cases sufficiently confirm the remark of M. Tiedemann,—that the adoption of the results of experiments on animals for the elucidation of the human functions is more uncertain the more remote the subject of the experiment is from man in its organization; and that the greatest errors may be indulged by unrestrictedly admitting into *human* physiology, the results of experiments instituted on worms, insects, mollusca, fish, and reptiles. (p. 16.)

Some judicious observations are added by the author on the mode in which the different results of experience and observation should be classified by the physiologist, and their truth or fallacy be detected; and he deduces from all his investigations on this subject, that physiology is an experimental science based on rational empiricism; that it ought not to abjure its empirical character in any of its propositions, assertions, and explanations:—that its axioms are conclusions drawn from observation and experiment, and that the rules and laws which induction points out for the phenomena and causes of life, have only a relative value according to the observations and experiments from which they have been deduced, and cannot be regarded as

* Dunglison's Physiology, Vol. I. p. 235.

truths until they have been modified or confirmed by ulterior observations. p. 83.

The great importance of the study of physiology as a branch of medical science is now so universally admitted as scarcely to need a comment. The works of Broussais and Jackson sufficiently exhibit the value of the pathological inferences which a knowledge of it suggests. Indeed, one of the most signal improvements that have attended the promulgation of the doctrines of the distinguished French professor, is the inculcation of a better attention to this branch which forms the truly scientific basis of medical knowledge. It is manifestly impossible to form any accurate judgment of the morbid condition of a function without being acquainted with its healthy manifestations; and what errors may not be indulged in therapeutics by an ignorance of this subject?

The whole class of diseases, termed *bilious*, are referred by most practitioners to direct disease of the liver; and medicines are unceasingly exhibited, which, from routine administration, have been presumed to act specifically on the liver, for the purpose of modifying its morbid condition. Calomel is one of these. If a person is presumed to be bilious, this drug is given by preference as a cathartic, because it is thought to possess some special cholagogue virtues, but how exerted the prescriber does not pretend to opine. The instructed physiologist is, however, aware that any irritation, excited by disease or art, at the termination of the excretory duct of any gland, is speedily propagated along the duct to the gland, which is thus stimulated to augmented secretion. He knows, moreover, from experience, derived from his own observations, or from those of others, that calomel is a cathartic which acts more especially upon the upper part of the intestinal canal, as aloes does upon the lower, and hence that it may irritate the termination of the choledoch duct in the duodenum, and thus give rise to increased secretion of bile, and, of consequence, to copious biliary discharges; so that instead of these discharges being an evidence that the individual is *bilious*, they may indicate no more in this case than that a cholagogue purgative has been taken, whilst the liver may have been previously in a perfectly healthy condition. This kind of stimulation of the mouth of the choledoch duct always takes place during digestion, by the contact of the chymous mass proceeding from the stomach, and occasions the necessary secretion and flow of bile into the duodenum. It will be obvious, then, that any undue accumulation of chymous materials in the duodenum, any irritation of the mucous membrane, any duodenitis or gas-

tro-enteritis may give occasion to copious hepatic secretion, and to all the manifestations termed *bilious*, whilst the liver itself may be free from any, except a correlative, derangement.

The advantages of physiology to medicine are dwelt upon at some length by M. Tiedemann; as well as the utility of an acquaintance with the accessory sciences of physics, chemistry, natural history in general, mineralogy, botany, and especially zoology and comparative anatomy, as preliminaries to the study of physiology, but his views are such only as must impress any one who reflects upon the subject.

The work of M. Tiedemann is intended to comprise the whole *physiology of man*, but the volumes before us are entirely occupied with *general and comparative physiology*, and are, consequently, introductory only to the main object.

The subject is divided into two books—the first embracing a *comparison between organized and inorganic bodies*, and the second a *parallel between animals and vegetables*. The former, although furnishing much interesting matter for reflexion, as well as the first section of the latter—embracing a parallel between animals and vegetables as regards their material composition—scarcely requires comment. The second and remaining section of the volumes includes a parallel between the manifestations of activity or of life in plants and animals; and consequently comprises a comparison between the various functions that are characteristic of animal and of vegetable physiology, commencing with the functions of *nutrition*. This section will give occasion to a few observations.

It is well known that many naturalists, as Van Helmont, Boyle, Duhamel, &c. have believed that plants are capable of living in pure water; and, of course, of drawing from this source their different elements. Wallerius concluded, from his experiments, that all the saline, earthy, and other matters, which are found in plants, are fabricated from the water: whilst Bergmann and Kirwan attempted to show that these matters must have been obtained from without. Tiedemann, however, affirms, that vegetables, whose seeds or organs grow in pure water, are chiefly nourished on the mucous and albuminous matters contained in those bodies, and dissolved by the liquid. This has always appeared to us to be the only satisfactory method of accounting for the growth of the hyacynth, tulip, and narcissus, in distilled water; and it has been noticed, that when they have sent forth their roots under such circumstances, they were covered with a mucilaginous or albuminous matter proceeding from the bulbs themselves. The fact is also proved by the much greater succulence of the whole flower than of the bulb.

The inorganic combinations found in plants on incineration, he considers, with De Saussure, Sir Humphry Davy, Lassaigne, and others, to be absorbed from the water in which they are dissolved, and he thinks there is not the slightest proof that living bodies in general, and vegetables in particular, are capable of *forming* elementary substances. The possession of such a power seems, indeed, to be most incomprehensible. Yet we have some apparently anomalous cases in both the vegetable and animal kingdom. Vauquelin found, by feeding a hen for ten days on oats, that 137.796 grains of phosphate of lime, besides 511.911 grains of carbonate of lime, were contained in the eggs and excreta, more than could be accounted for by the food taken; and that of the silica, contained in the oats on which it had been fed, 34.282 grains had disappeared. The inferences, consequently, were, that lime—and perhaps phosphorus—is not a simple substance, but a compound, and formed of ingredients existing in oats, water, or air—the only substances to which the fowl had access; and that silica must have entered into its composition, as a part had disappeared. Since that time lime has been proved to be a compound; but phosphorus still retains its rank among elementary bodies. If, however, we admit the accuracy of Vauquelin's results, which, as he gives them, are certainly arithmetically incorrect, we must be compelled either to regard it as a compound, formed in the plant under the vital influence, or else that the same influence is capable of forming elementary bodies, which we have seen is most incomprehensible. The experiments of Vauquelin require repetition, and *a fortiori* as others seem to have shown, that certain birds cannot produce eggs unless they have access to calcareous earths.

In commenting on the views of different vegetable physiologists, respecting the necessity of organic matters for the nutrition of plants, M. Tiedemann is not accurate in stating the opinions of Mirbel and Smith regarding one point of difference between animals and vegetables.

"The difference," he remarks, "between vegetables and animals, (laid down by Mirbel and Smith,) in the former subsisting on organic matters and the latter on inorganic, cannot be supported, as is proved, besides other instances, by that of parasitic plants, which live at the expense of the juices of those on which they attach themselves." p. 230.

The remark of Mirbel, in his *Traité d'Anatomie et de Physiologie Végétales*, is, "that plants alone have a power of deriving nourishment, *though not indeed exclusively from inorganic matter*, mere earths, salts, or airs, substances certainly incapable of serving as food for any animals, the latter only feeding on what is or has been

organized matter, either of a vegetable or animal nature. So that it should seem to be the office of vegetable life alone to transform dead matter into organized living bodies." On this Sir James Smith remarks, that the idea appears to him so just, that he has in vain sought for any exception to it. The fact, however is, that we have examples of certain animals, which appear to do without organic matter as well apparently as the vegetable. The experiments of HASSENFRATZ, THEODORE DE SAUSSURE, LINK, and others, have shown, that in a soil totally devoid of organic matter, plants vegetate miserably, and often do not shoot at all; rarely proceeding to inflorescence, and still more rarely to fructification; whilst the toad has been found imbedded in rocks,* and gold fish have been kept for months in distilled water;—a circumstance which led Dr. FORDYCE to infer, that animals might live on water and air alone. Again, KESSLER, LABILLARDIERE, GUMILLA, HUMBOLDT, and others, have made us acquainted with savage tribes, who use certain varieties of fat, unctuous earths, as articles of diet; and, according to the last writer, the quantity of clay consumed by the Ottomaques of our own continent, and the greediness with which they devoured it, seemed to prove that it did more than merely distend their hungry stomachs, and that the organs of digestion had the power of extracting from it something convertible into animal substance.

M. Tiedemann regards all nutritive absorption, both of vegetables and animals, as an organic or vital phenomenon. In the upper classes of animals he conceives it to be effected by lymphatics; in other animals, furnished with blood-vessels—the mollusca, crustacea, arachnidea, insects, annelides and radiaria—in which lymphatics have not been discovered, by veins, or perhaps by lymphatics, which open immediately into veins; and in such animals as have had no blood-vessels—the entozoa, (?) medusæ, and polypi, by the cellular tissue. The facts and arguments, however, adduced by Dr. DUNGLISON, in his "*Human Physiology*," appear to show, that in man the chyliferous and lymphatic vessels form only chyle and lymph respectively, refusing all other substances: that the veins admit every liquid which pos-

* Certain experiments recently published by Professor Buckland, of Oxford, have led him to infer that toads cannot live a year totally excluded from atmospheric air, and that it is probable they cannot survive two years if entirely excluded from food, and he therefore concludes, that there is a want of sufficiently minute and accurate observation in those so frequently recorded cases, where toads are said to have been found alive within blocks of stone and wood, in cavities that had no communication whatever with the external air. But the capability of existence for so long a time as that admitted by Professor Bucklandis sufficiently surprising.

sesses the necessary tenuity; and that whilst all the absorptions, that require the substance acted upon to be decomposed and transformed, are effected by the chyliferous and lymphatic vessels, those that require no alteration are accomplished directly through the coats of the veins by imbibition.

M. Tiedemann manifestly believes in the minute lymphatics, which Fohmann, Lauth, and others, have presumed to exist in the intestinal canal, and to communicate immediately with the veins of the intestines, so as to convey substances from the intestinal canal into the venous system. Such vessels would seem, however, to be totally unnecessary, and their very existence has been denied by most anatomists. The coats of the veins readily admit of imbibition, and therefore substances of the necessary tenuity could pass into them without the agency of these vessels; and, again, if we grant that such carrier-lymphatics do exist, there would seem to be no use for the chyliferous vessels and glands through which the chyle proceeds on its way to the thoracic duct and subclavian vein, seeing that it could get at once into the venous blood by means of these lymphatics.

It is probably by venous imbibition that the trifling absorption effected by the human skin is accomplished. In animals, provided with a cuticle, the amount of absorption in this way is but small, and has even been denied altogether; but in those animals, in which the cutis vera is exposed, the nutritive absorption is effected through this envelope. In the polypi, medusæ, radiaria, and vermes, the absorption is active, and, according to Zeder and Rudolphi, those entozoa that live in the midst of animal humours imbibe them through the skin. A few years ago Jacobson instituted experiments on the absorbing power of the helix of the vine, *(Limaçon des vignes.)* A solution of prussiate of potassa was poured over the body, which was rapidly absorbed, and entered the mass of blood in such quantity that the animal acquired a deep blue colour when sulphate of iron was thrown upon it. In the frog, toad, salamander, &c. according to the experiments of Townson and Edwards, the cutaneous absorption is so considerable, that occasionally the weight of water, taken in in this way, is equal to that of the whole body.

The chapter on the *assimilation of food in the first passages* is brief, and comprises the opinions contained in an *Essay on Digestion*, published some years ago by the author in conjunction with M. Gmelin. The power of assimilation—that is of converting the food into the nature of the being it is destined to nourish—a power possessed by all organized bodies, vegetable as well as animal, is properly regarded by the author to be an essentially vital act, and there-

fore, we would say, beyond the limits of our knowledge. M. Tiedemann, however, affirms it to be owing to the action of liquids secreted by living bodies and added to the alimentary matters, which produce peculiar changes in the chemical composition of those matters, under the influence of the *nisus formativus*, whose agency in generation and nutrition is so much invoked by many of the German physiologists. The action of the different fluids poured out from the supra-diaphragmatic portion of the digestive tube, from the stomach,* and small intestine, and from the liver and pancreas, are doubtless important preliminary steps to the formation of the chyle, but it is probable that they only modify the physical characters of the chymous mass in such manner that chyle can be formed from it by the chyliferous vessels. The true animalization would seem to be effected by those vessels, as they are capable of forming the same fluid—chyle—from the chymous mass presented to them, whatever may have been the nature of the aliment that constitutes it. How this is accomplished we know not, and we only express our ignorance when we refer it to the *nisus formativus* or *Bildungstrieb.*

The chapter *on respiration* is a digest of the opinions of different physiologists on the function as executed by the vegetable, and contains a good account of the peculiarities of the respiratory apparatus and function in the various classes of animals.

The *air-bag* or *swim-bladder* of fishes is regarded by the generality of naturalists as accessary to the organs of motion. It is situated in the abdominal cavity along the spine, and commonly communicates with the pharynx or stomach by means of a membranous canal—the

* Much light, we learn, has been thrown on the nature and properties of the digestive secretions of the stomach, by certain experiments recently performed by Dr. Beaumont, of the United States' Army, and Professor Dunglison, of the University of Virginia, who visited Washington a few months ago for the purpose. Several years since a Canadian had his stomach laid open by a musket-shot, and several of his ribs so much injured, that a whole rib, and portions of others, required removal. By the skill and attention of Dr. Beaumont, he ultimately recovered, except that an aperture was left communicating with the stomach, and around which the torn edges of that viscus contracted an adhesion. Through this aperture substances can be passed so as to test their comparative digestibility, and gastric juice can be obtained in sufficient quantity for experiments on artificial digestion, &c. The existence of such a secretion always possessing, essentially, the same properties, its solvent, antiseptic, and other qualities, have been satisfactorily established, and we are informed that as soon as Dr. Beaumont has concluded a series of experiments on the comparative digestibility of various alimentary substances, the valuable and interesting results will be laid by him before the public. We may be allowed to express a hope that this Journal may be the chosen vehicle for such publication.

ductus pneumaticus. The bag is well supplied with blood-vessels, and receives nervous branches from the pneumogastric nerve, and from the great sympathetic. The air which it contains is usually composed of the same elements as atmospheric air—oxygen, azote, and carbonic acid. The researches of Biot showed the proportion between the oxygen and the azote to vary according to the species; and the proportion of oxygen to augment according to the depth at which the fish was caught;—a circumstance that induced Biot and De la Roche to endeavour to ascertain the proportion of oxygen contained in sea-water at different depths, but they were unable to perceive any difference. From these insufficient experiments it was inferred, that the air contained in the air-bag is a secretion; that in fishes which live near the surface azote is separated, but in those which live at great depths, the quantity of oxygen is proportionally increased. Further experiments might, however, indicate, that the varying character of the contents of the bag correspond with the air contained in the water at different depths, and thus confirm the views of Fischer, Nitsch, Treviranus, Tiedemann, and others, that the organ is accessory to respiration.

"Those fishes," says our author, "that are remarkable for very active and prolonged movements, seem to be chiefly such as respire with the assistance of this organ. They appear to accumulate respirable air in it, whenever so circumstanced as to take in more than they can consume, and employ it whenever they are so situated as to need a larger supply. This hypothesis is favoured by the fact, that flying fish, as the *triglæ*, and, according to the researches of Humboldt, the *Exocœtus volitans*, are provided with ample air-bladders. De la Roche likewise remarked the organ very large in the *Scorpæna volitans*, whilst the species of the same genus that do not fly, (*Scorpæna porcus, scrofa, dactyloptera, &c.*) have it not. An ample air-bag is found, also, in the species of the salmon genus, the *Xiphias, pike, perch, herring, bichir, &c.* distinguished by the velocity with which they swim, whilst we meet with none in those fishes that are accustomed to remain at the bottom of the water, and whose movements are slow, as the *ray, Lophius, lamprey*, several *Blennii, Tæniæ, Echeneis, Cotti, Pleuronectes, &c.* It is also yet doubtful, whether the air-bladder should be considered, in addition, as an organ accessary to natation, so as, by its distention or contraction, to permit the fish to rise or sink in the water, as Borelli imagined. As several fishes, which are devoid of air-bags, are nevertheless good swimmers, and as, moreover, the organ does not always communicate with the pharynx and stomach by means of a duct that allows the air to pass out; and as it is, in the *Cobitis fossilis*, for example, occasionally inclosed in a bony capsule, which, consequently, does not allow it to dilate or contract, this opinion does not appear probable. It may also be alleged, that fishes, whose air-bags have been ruptured, have preserved the power of rising and sinking in water, as the experiments of Humboldt and Provençal have demonstrated." p. 313.

It will be obvious, however, that the want of a *ductus pneumaticus* is as unfavourable to the view which M. Tiedemann supports, as to the one against which it is adduced: moreover, the simple experiment of puncturing the air-bladder has often been performed *with* the effect of causing the animal to fall to the bottom, from which it was not subsequently able, by any exertion of its fins, to raise itself. These discrepancies environ the subject with difficulty. The eel, too, it may be remarked, which always resides at the bottom, has an air-bag, whilst the mackarel, which pursues its prey at the surface, has not this *balancing* organ, as it has been presumed, by some, to be.

In man, respiration or the arterialization of the blood is chiefly accomplished in the lungs, owing to their formation being so admirably adapted to the purpose; and it is probably not effected to any extent elsewhere, owing to the cuticle not readily permitting the absorption and exhalation of air. In many animals, however, the whole conversion can be accomplished through the skin. The air, which comes in contact with the common integuments, is found to undergo the same changes as that which enters the respiratory organs. The frog, salamander, and triton, at a low temperature, will remain for weeks and months in the water without breathing by the lungs; which they do not employ until the temperature reaches 50° of Fahrenheit. The cutaneous respiration would seem, indeed, to be of greater moment to these animals than the pulmonary. Spallanzani found, that frogs, whose lungs had been removed, lived longer than others whose skins had been smeared with oil, and similar results attended the experiments of Edwards. Respiration by the skin takes place likewise in the *Saurii*, *Ophidii* and *Chelonii*, according to the experiments of Spallanzani and Edwards. In the *Ophidii* and the *Chelonii*, pulmonary respiration suffices during summer, when the temperature is not too elevated; but the *Saurii* are compelled, in addition, to respire by the skin, and they die in summer, in the course of a few hours, if restricted to pulmonary respiration.

In the chapter *on the movement of the nutritive fluid*, or *on the circulation*, M. Tiedemann is the supporter of some singular positions. He affirms it to be, in his opinion, proved, that the movement of the blood is owing as well to the

"manifestations of activity in the parietes of the spaces in which the blood is contained, as to an inherent property in the living blood itself—that is, in the globules—of moving by its own impulsion: and that it seems, moreover, that the organs, the substance of which is undergoing perpetual change, exert on the blood an attraction, which likewise favours its movement."

These positions, he states, will be treated more amply under the circulation of the blood in man, but he offers some observations in the work before us, which will require a brief notice.

He properly regards the "irritable heart" as the chief agent in the propulsion of the blood into the arteries; and the stimulus, which excites the heart to contraction, he thinks to be the blood, "as Haller has sufficiently established by numerous experiments;"—the irritability of the heart continuing as long as the nutritious vessels convey arterial blood to its substance, but rapidly diminishing and being soon destroyed in a heart separated from the body.

Many of these views are by no means as clear as the author conceives them to be. On the contrary, Mr. Brodie found in some of his experiments, that when the heart was emptied of its blood it still contracted and relaxed alternately; and the experiments of Dr. J. K. Mitchell, detailed in a late number of this Journal, prove, in the most satisfactory manner, that the power of contractility can be excited to action by simple distention with gaseous fluids. A heart of the *Acipenser brevirostrum* was taken out and laid on the ground, and after a time, having ceased to beat, was inflated with the breath, for the purpose of drying it. Hung up in this state it began to move, and continued for ten hours to pulsate regularly, though more and more slowly, and when last observed in motion, the auricles had become so dry as to rustle when they contracted and dilated. The heart of a snake, when torn from the body, has been seen to continue its contraction for hours; and when the heart of an animal is separated from the body, it may be stimulated to contraction by being immersed in warm water, or pricked with a sharp-pointed instrument.

The arteries, the author thinks, consist of a peculiar fibrous membrane, and are extensible, elastic, and endowed with a vital power of contraction, not identical, however, with muscular irritability, and which he terms, with Parry, *tonicity*. The cause of the blood not flowing by pulses, but in a continuous manner, is owing, he conceives, to the force of impulsion from the ventricle being enfeebled by distending the arterial parietes: and the motion of the blood in the vascular radicles he attributes to the contractility of the arterial parietes; and to the property, possessed by the blood, of moving by its own impulsion. He seems to doubt whether the arteries terminate immediately in the veins, in the capillary circulation, or whether the

"currents of blood are surrounded by vascular parietes in their passage from the arteries to the veins, as Leeuwenhoek, Haller, Spallanzani, and others, aver-

red; or whether they are only contained in canals excavated in the cellular tissue, as Gruithuisen, Döllinger, Carus, and others, have pretended;"

but he regards it to be an established fact, that at its first appearance in the *figura venosa* of the incubated egg the blood is not surrounded by vascular parietes.

The course of the blood along the veins is considered by M. Tiedemann to be owing to the constant flow from the arteries, the elasticity and vital contractility of the venous parietes, and to the active expansion of the auricles—the *suction power* or *derivation* of HALLER, WILSON PHILIP, CARSON, JUGENBUEHLER, SCHUBARTH, and others.

So far the physiologist may entirely accord with M. Tiedemann with regard to the forces that propel the blood, but it seems to us entirely inadmissible to ascribe any effective influence of this kind to the blood itself. The vital attraction exerted on the blood by the organs has probably some effect, but it cannot, perhaps, be great. The following is the author's views of the nature of this agency, which he promises more in detail when he treats, hereafter, of the circulation in man:—

"If any part increases its action, either in consequence of an internal or external excitation, or by the influence of the nervous system, more blood is directed towards it. If any external part, the conjunctiva, for example, or a portion of the skin be mechanically stimulated, rubbed, exposed to an elevated temperature, or if an electrical spark be drawn from it, or if it be placed in contact with the two poles of a galvanic pile, the blood will immediately rush towards it in increased quantity, and it will become red. The same thing happens in the case of a wound. All the membranes, which secrete mucous or serous fluids, and all the secretory and other organs likewise admit more blood when stimulated. This cannot be attributed to augmented action of the heart, as that exerts its influence on the mass of blood only, and cannot modify the quantity of the liquid which passes to particular parts of the body. It seems rather to be owing to the organ, whose action becomes excited, experiencing more prompt changes in its material composition, and on that account attracting arterial blood more rapidly, and in greater abundance, this fluid being alone capable, by reason of its influence on nutrition, of rendering the part fit for deploying an increase of energy." p. 350.

The chapter on *nutrition* is almost wholly occupied by a disquisition on the supposititious *plastic force, force of nutrition, nisus formativus, &c.*—as it has been variously termed—to which we have already alluded.

The next chapter, and one of the most interesting in the work, is on the *secretion of the humours;* but it does not admit of analysis, being chiefly confined to a description of the various secretions—so numerous in animals—and of the different organs by which they are accomplished. The process M. Tiedemann considers to ad-

mit of no explanation based on principles of mechanics and chemistry, as the imaginary theories of the iatromathematical and iatrochemical schools have sufficiently demonstrated. It is an act of life, and can only be regarded as the effect of organic forces. This is correct as respects those secretions that require a true formation, or elaboration, but it does not appear necessary to invoke that agency in the case of fluids, which exist in the blood in the same state as after their secretion, and require simple transudation through the coats of the containing vessel—as the fluids which lubricate the serous membranes.

In the third division of his work, M. Tiedemann treats of the *disengagement of imponderable matters;* and his first chapter is on the *disengagement of heat in living bodies.* In this we have an excellent epitome of the results obtained by different observers regarding the temperature of animals—the mammalia, birds, reptiles, fish, and insects. On the different theories of calorification the author is extremely brief. He considers that the only point, which can be regarded as indisputable, is, that the disengagement of heat is a vital phenomenon, immediately dependent upon acts of nutrition which he esteems the "determining and conservative cause of life."

"The intussusception of alimentary matters and their assimilation by digestion and respiration, the circulation of the humours, nutrition, and secretion, the renewal of materials which accompanies the exercise of life, and the constant changes of composition in the solid and liquid parts, all of which are under the nervous influence, participate also in the production of heat, and we deceive ourselves when we look for the cause in one of these acts only. The intensity of the disengagement of caloric, and the faculty, possessed by animals, of maintaining themselves at a temperature proper to each species, are in a direct ratio with the composition of their organization, and the sum and intensity of their manifestations of activity. Birds and the mammalia which take their food after the shortest intervals; which digest most rapidly, consume most oxygen, and give off most carbonic acid; whose circulation is most energetic and rapid; which exhibit the most persistence in their movements; in which we observe the most intense effects on the part of the nervous system; which secrete the most various humours, and in which all the phenomena announce that the renovation of matter occurs in the most prompt and active manner, are those animals whose temperature is the most elevated, and which can maintain it most uniformly at a temperature peculiar to each. Reptiles, fish, insects, the mollusca and worms, whose structure is less complicated, whose vital phenomena exhibit less diversity, and in which the above-mentioned acts of life have less intensity, have a less degree of heat. They are liable to vary as regards their temperature, and their faculty of engendering heat is restricted within the narrowest limits." p. 515.

The two succeeding chapters—*on the disengagement of light* in or-

ganized bodies, and *on the electrical phenomena of living bodies*, are replete with interesting information on these topics of comparative physiology, and may be consulted, like every other portion of the work, with great advantage by the scientific naturalist.

The *phosphorescence* of animals, of which the author adduces all the examples with which we are acquainted, seems to him to be dependent upon a matter produced by the changes of composition that accompany life, and which appears to be secreted from the mass of humours by particular organs.

The "liquid" he thinks, probably contains phosphorus, or a similar combustible substance, which combines with the oxygen of the air contained in water at a medium temperature, and thus occasions the disengagement of light. The preparation and secretion of this substance are acts of life, that change, augment, or decrease by the influence of those stimulations from without, the action of which on animals modifies their vital manifestations. p. 549.

The phosphorescence itself, however, M. Tiedemann holds to be owing to the composition of the secreted matter, and not to be regarded as a vital act, inasmuch as at times it persists even for days after the death of the animal.

"All that we can say, on the destination of the light in the economy of luminous insects, is, that the preparation and secretion of the luminous matter tends to the preservation of life in those animals. We shall not, however, deny that the light may permit the sexes to find each other more readily at the periods for copulation; as the males are observed to be attracted by shining objects. It may also, perhaps, serve to preserve them from the aggressions of certain enemies."

It must be admitted, however, that the ultimate end of this phosphorescent property is sufficiently inscrutable.

In the conclusion of the chapter on the *disengagement of light*, our author refers to the sparkling of the eyes of several mammalia—cats, dogs, wolves, foxes, martins, and other carnivora, as well as of the sheep, cow, and horse—which has been ascribed to a phosphorescent power. Pallas thought that the light, in these cases, emanates from the nervous expansion in the eye, and he regarded it as an electrical phenomenon. B. Prevost, however, found it to occur, in general, in those animals that are provided with a tapetum; and the experiments of Gruithuisen, Esser, and Tiedemann, have shown that the phenomenon never occurs when the light is totally excluded. Gruithuisen observed it in the dead as well as in the living animal. Tiedemann perceived it in a cat which had been decapitated for twenty

hours, and it did not cease until the humours had become turbid. These facts, consequently, justify the conclusion, that the ocular brilliancy in those animals is owing to the reflexion of light from the inner layer of the choroid, and that it ought not to be reckoned phosphorescent.

All living bodies probably develope *electricity* to a greater or less extent, during the incessant changes of renovation and decomposition that are occurring through the whole period of existence. Pouillet affirms that he has observed a disengagement of electricity after the germination of plants. He placed in a chamber,—the air of which was kept sufficiently dry by means of quicklime—several pots of earth on an insulated stand, and in these he sowed different seeds. The stand was connected with a condenser. During the germination there was no indication of electricity; but scarcely had the seeds germinated when signs of electricity were perceptible, and when the young plants were in a complete state of growth, they communicated a charge to the condenser, which separated two leaves of gold half an inch asunder. Pouillet thinks, also, that plants develope electricity when they exhale carbonic acid gas, as the gas gives indications of electricity at the moment of its formation: and he conceives that the action of vegetables on the air is one of the chief sources of atmospheric electricity.

Galvani was the first to point out, that when nerves and muscles are exposed in a living animal and brought into contact, contractions or convulsions occur in the muscles. He decapitated a living frog, removed the forepaws, and quickly skinned it. The spine was divided so as to leave the spinal marrow communicating only with the hind extremities by means of the lumbar nerves. He then took in one hand one of the thighs of the animal, and the vertebral column in the other, and bent the limb until the crural muscles touched the lumbar nerves. At the moment of contact the muscles were strongly convulsed. The experiment was repeated by Volta, Aldini, Pfaff, Humboldt, and others, and with like results. Aldini observed convulsions in the muscles by the contact of those organs with nerves, not only on the same frog, but also on two different frogs. He adds also that he remarked them when he put the nerves of a frog in connexion with the muscular flesh of an ox recently killed. Humboldt made numerous experiments of this kind on frogs. He found convulsions supervene when he placed upon a dry plate of glass a posterior extremity whose crural nerves had been exposed, and touched the nerves and the muscles with a piece of raw muscular flesh, in-

sulated at the extremity of a stick of sealing-wax. Convulsions likewise occurred, when, instead of one piece of flesh, he used three different pieces to form the chain, one of which touched the nerve, the other the thigh, and the third the two others. The experiments were repeated by RITTER with similar results, but they are only found to succeed when the frogs are full of vital activity, especially in spring after pairing; when the animals are of sufficient size, and the preparation of the animal for the experiment has been rapidly accomplished. From these experiments it is inferred, that parts of an animal may form galvanic chains, and produce a galvanic effect, which, independently of any mechanical excitation, may give rise to the contraction of muscles. p. 560.

This excitation of electricity in chains of animal parts, M. Tiedemann concludes, ought not to be esteemed a vital act. Its effects only—the contractions excited in the muscles—are dependent on the vital condition of the muscles and nerves. He thinks, however, that the electricity, excited in chains of heterogenous animal parts, may be modified and augmented by the organic or living forces; and that, moreover, organs exist in certain animals, the arrangement of which is such as to excite electricity during their vital action—as in the electrical fishes, of the different species of which M. Tiedemann gives an interesting account, so far as regards the structure and functions of their electrical organs.

"From the researches," he remarks, "hitherto made, regarding electrical fishes, it appears that the shocks which they give during life are of an electrical character, and more analogous to the effects of a voltaic pile than to any other phenomenon. The electro-motive organs, peculiar to these animals, exhibit also in their structure a great resemblance to one of those piles of the second class, inasmuch as they are composed of alternate layers of moist conductors of different nature: viz. of membranous disks, and of a gelatinous or albuminous fluid. It cannot, however, be admitted that their effects are solely owing to their structure,—to the mechanical arrangement of the parts which enter into their composition; for, after the section of the nerves that pass to the electrical organs, they immediately lose the power of giving shocks, although the heterogeneous strata, constituting them, may have experienced no change. The experiments of philosophers have as yet taught us nothing respecting the *modus operandi* of the indispensable nervous influence on the organs, or the part which it plays in exciting shocks. In this state of things we are compelled to consider the electrical charge and discharge of the organs as a vital act, which depends immediately on the influence of the nerves on those organs, and to look upon these as apparatuses, which concur in a secondary manner in the production and discharge of the galvanic electricity, under the vital coöperation of the nerves. It will be impracticable, however, to give an exact account of the mode in which the nerves act in exciting electricity, so long as we are

ignorant of the mode of action of the nervous force itself. The complete theory of these remarkable electrical phenomena can only be attained by fresh observations and researches on the manifestations of life in the nerves themselves. Sir Humphry Davy presumes, from his experiments, that animal electricity has more analogy with common electricity than with the voltaic, and it seemed to him more probable that it constitutes a distinct species of electricity." p. 580.

Several other phenomena, which, the author conceives, render it probable that the nerves of the animal economy, by virtue of an inherent force, are capable of exciting and conducting electrical currents, similar to those produced by the union of the poles of a galvanic pile, are merely alluded to by M. Tiedemann, as likely to fall under consideration in a subsequent part of his work. Our remarks upon them must, consequently, be postponed until another occasion. We may merely refer, at present, to the novel and ingenious view of MM. Prevost and Dumas on the agency of electricity in the production of muscular contraction. By means of a microscope, magnifying ten or twelve diameters, they examined the mode in which the nerves are arranged in a muscle; and found, that their ramifications always enter the muscle in a direction perpendicular to its fibres. They satisfied themselves that none of the nerves really terminate in the muscle; but that the final ramifications embrace the fibres like a noose, and return to the trunks that furnished them, or to others in their vicinity; the nerve setting out from the anterior column of the spinal marrow, and returning to the posterior. On further examining the muscles at the time of contraction, the parallel fibres composing them were found, by the microscope, to bend in a zigzag manner, and to exhibit a number of regular undulations; the flexions forming angles, which varied according to the degree of contraction, but were never under fifty degrees. The flexions, too, always occurred at the same parts of the fibre, and to them the shortening of the muscle was owing, as MM. Prevost and Dumas proved by calculating the angles. The angular points were always found to correspond to the parts where the small nervous filaments enter, or are attached to, the muscles. They therefore believed that the filaments, by their approximation, induce contraction of the muscular fibre; and this approximation they have ascribed to a galvanic current running through them, which, as the fibres are parallel, and very near each other, they think, ought to cause them to attract each other, according to the law laid down by Ampere, that two currents attract each other when they move in the same direction.*

* Dunglison, Vol. I. p. 313.

Soon after hearing of Ampere's discovery of this attraction of electrical currents, it occurred to Dr. ROGET, that it might be possible to render the attraction between the successive and parallel turns of a heliacal or spiral wire very sensible, if the wires were sufficiently flexible and elastic; and, with the assistance of Mr. FARADAY, his conjecture was put to the test of experiment in the laboratory of the Royal Institution of London. A slender harpsichord wire, bent into a helix, being placed in the voltaic circuit, instantly shortened itself whenever the electric stream was sent through it, but recovered its former dimensions, the moment the current was intermitted. From this experiment it was deduced, that possibly some analogy might hereafter be found to exist between the phenomenon and the contraction of muscular fibres.

The last section of the work before us consists of an elaborate disquisition on the movements of organized bodies, in which the author enumerates the different movements of animals and vegetables, with the organs that execute them, and the circumstances under which they are effected. He then compares the movements of the two groupes of living beings, to discover in what points they are similar, identical, or different; and finally, he inquires into the causes and forces on which they are dependent, and whether they are accomplished by the same or by different forces.

The great vital force, according to M. Tiedemann, is that of *excitability*, by which he understands a property or faculty possessed by all living bodies, animals and vegetables—and by every part of these, even their germs—of being impressed by extraneous agents or influences, as well as by excitations produced within themselves, and of being excited by such influences and excitations to manifestations of action and to perpetual changes. This property he considers to be different in every animal tissue, and in every organ, all of which are solicited to action by special irritants, "according to the equally special constitution bestowed on them by the act of formation." The same applies to the vegetable. The cellular tissue, the different kinds of vessels, the roots, leaves, secretory organs, genital organs, flowers, pistil and stamina, are differently excitable according to their differences in structure, and the properties impressed upon them by the act of formation and development, and are impelled to the discharge of their functions by different excitations. It need scarcely be remarked that this excitability is communicated to the parts by the vital principle; that its essence is inscrutable; its agency passing all understanding; and that the adoption of the term "*plastic*

force," which M. Tiedemann regards as the cause of this excitability does not render our darkness less impenetrable.

The last sections of the work relate to *contractility* as a vital property possessed by animals and vegetables; and by the different textures of the animal frame; but the absence of novelty, and the length to which this article has already extended, induce us to bring our analysis to a termination.

It has been already remarked, that the volumes before us can only be regarded as introductory to the great object of M. Tiedemann's undertaking, which is, as the title imports, a *Complete Treatise on the Physiology of Man*. They comprise, however, an excellent and copious register of facts on animal and vegetable physiology in general, and embrace a large portion of what may be called the *philosophy of organized existence*. On every topic the erudition of the author is conspicuous, and the facts and arguments of the most trusty observers are faithfully recorded with an industry which may be characteristically termed *German*.

We look forward with pleasing anticipations to the further progress of the work, and may be allowed to express a hope that M. Tiedemann will not follow the example of his distinguished countryman, Rudolphi, in permitting so long an interval to elapse between the publication of the separate parts, as occurred in the case of the *Grundriss der Physiologie* of that gentleman. Not the most unimportant evil attendant upon such a course is, that in a progressive science, like physiology, the earlier volumes are by no means fit representatives of the condition of the science at the period when the work is completed.

The impracticability of procuring the German original, has compelled us to confine our review to the French version. M. Jourdan is well known as a laborious translator into his own language of the works of the chief German writers on many portions of medical science; and his standing is at the same time elevated, amongst his countryman, as a learned and accomplished physician. We have no doubt, therefore, that justice has, in general, been done to M. Tiedemann in the version; although obscurities and tautologies occasionally occur, which would strike us as more properly chargeable, perhaps, to the translation than to the original. R.

ART. VII. *The Dispensatory of the United States.* By GEORGE B. WOOD, M. D. Professor of Materia Medica and Pharmacy in the Philadelphia College of Pharmacy; Member of the American Philosophical Society, &c. &c.; and FRANKLIN BACHE, M. D. Professor of Chemistry in the Philadelphia College of Pharmacy; one of the Secretaries of the American Philosophical Society. Philadelphia, 1833, pp. 1073.

THE irregular and apparently capricious manner in which most, if not all, the sciences have advanced in their career of usefulness and certainty, can scarcely have failed to have been noticed by the attentive observer. Their march has, in fact, been characterized by marked alternations of inactivity and rapid advances, or even in some instances, by retrograde movements. Neither has the progress of the whole been simultaneous; on the contrary, in every age some one has exercised an overweening influence, and after having enjoyed its sway for an indefinite period, gradually gave way to the increased popularity of another.

These remarks will also hold good as respects the different branches of the same science, and to none are they more applicable than to the pharmaceutic art, whose vicissitudes and alternate subjection to one or other of its kindred sciences are both interesting and instructive. It is also an extraordinary fact, that notwithstanding the great improvements which have been effected in this division of the medical art, that the value and practical utility of the records of these improvements should not have increased in an equal ratio. Thus too many of our Dispensatories instead of being a "chronicle of the times," present us with the opinions and learning of by-gone ages. Now, no science has been more modified by the lapse of years than that of pharmacy; and whatever may be our esteem and admiration of the precepts and doctrines of our forefathers, every day presents this art in aspects and circumstances of so different a character, as to render a consideration of its present state of paramount importance.

We, therefore, hailed with no inconsiderable pleasure the appearance of the Dispensatory of the United States, convinced from our knowledge of its authors, that it would prove a most valuable addition to our medical literature. We have not been disappointed in these expectations, and feel fully persuaded that it will take the first rank among works of this character.

We are for the first time presented with a Dispensatory in the English language, which is not a mere *rifacimento* of that of LEWIS,

the general basis on which all subsequent publications of this nature have hitherto been constructed; added to and altered it is true, in many important particulars, but still retaining the strongest marks of the antiquity of their chief materials. We do not by this intend to say that the components of the present work are all, or in any proportion original, as from its very nature it ought necessarily to be constructed of such as had already been tested.

The duties of the authors of works of this description, are by patient industry and diligent research to gather in a small compass the experience and observations of others, however diffused through voluminous records, or floating in a traditionary form on the shoreless ocean of knowledge. To such a collection of materials they must apply the analytical and synthetical processes of judgment, selection and combination, so as to present their spirit and substance condensed into plain and practical results. These duties have been most satisfactorily performed by Drs. Wood and Bache, who have displayed in the accomplishment of their difficult task, a rare combination of untiring industry, extensive learning, and sound judgment.

The Dispensatory of the United States is divided into two parts, the first of which, and much the largest, is devoted to a consideration and description of the various articles of the materia medica; and the second to the various pharmaceutic preparations of these articles. The objects of the authors in their arduous undertaking are thus stated in their preface. After speaking of the Dispensatories of Duncan and Thomson, they observe that these works—

"Were calculated especially for the sphere of Great Britain, and are too deficient in all that relates exclusively to this country, to admit of being received as standards here. In the history of our commerce in drugs, and of the nature, growth, and collection of our indigenous medical plants; in the chemical operations of our extensive laboratories; and in the modes of preparing, dispensing, and applying medicines, which have gradually grown into use among us, there is much that is peculiar, a knowledge of which is not to be gained from foreign books, and is yet necessary to the character of an accomplished American pharmaceutist."

This design has been accomplished in a far greater degree than could have been expected, even by the most sanguine; and we are presented with details respecting our drug markets, and the processes and products of our laboratories, that cannot fail to prove of extreme importance. In this almost untrodden field the authors have spared no labour or research, though it must be admitted that much, very much, yet remains to be effected; for in no part of the apothecary's business does there exist a more lamentable ignorance, than of the

origin and distinction of closely allied articles of the materia medica. It must strike the merest tyro in the profession, that there are a vast number of articles constantly thrown into our drug market under a common appellation, whose origin, and even in some cases, whose properties are essentially different. Thus, under the names of gum Arabic, gum tragacanth, catechu, senna, and many others, we are presented with a variety of dissimilar articles. In making these observations, we do not intend to censure the authors for not having gone more fully into this subject; on the contrary, we have been highly gratified to perceive how much they have accomplished, in this laborious part of their undertaking. To perfect the task must require a long time, and the united and persevering efforts of many.

"The Pharmacopœia of the United States has been adopted as the basis of this Dispensatory. It is followed both in its general division of medicines, and in its alphabetical arrangement of them under each division. Precedence is, in every instance, given to the names which it recognises; while the explanations by which it fixes the signification of these names, are inserted in immediate connexion with the titles to which they severally belong. Every article which it designates is more or less fully described; and all its processes, after being literally copied, are commented on and explained, whenever comment or explanation appeared necessary."

"But though precedence has thus been given to the Pharmacopœia of the United States, those of Great Britain have not been neglected. The nomenclature adopted by the different British Colleges, and their formulæ for the preparations of medicines, have been so extensively followed throughout the United States, that a work intended to represent the present state of pharmacy in this country would be imperfect without them. The Pharmacopœias of London, Edinburgh and Dublin, have therefore been incorporated in all their essential parts into the present work. The medicines directed by the British Colleges are all described, and their processes either copied at length, or so far explained, as to be intelligible in all essential particulars."

This plan is the only one that can rescue pharmacy from the irregular and confused state in which it has existed in this country; and it is imperative on both physicians and apothecaries to take the United States Pharmacopœia as their text book, as far as practicable; for even granting that it is not as satisfactory as could be wished in all its details, still it is far superior to any work of the kind that has emanated from the American press. The science of pharmacy can never attain the rank to which its usefulness entitles it, without a consentaneous feeling among its votaries, and a firm determination to promote the general good, regardless of sectional feeling, or mere mercenary competition. At present, with the exception of those who have felt the ill effects of this want of uniformity, and have adopted the National Pharmacopœia as their guide, there is the most utmost dis-

crepancy in the different sections of our country, not only in the nomenclature, but also in the strength of the different medicinal preparations. It is to be lamented that the proposal made by Van Mons in the preface to his Pharmacopœia, that there should be a convention of deputies from all the states of Europe, to establish an uniformity of pharmaceutical practice, had not been adopted; what an elevated station would pharmacy have now occupied, if the labours of all her votaries had been turned in one direction, instead of being, as they now are, diverted into so many different channels?

At the same time, we should be sorry to see any Pharmacopœia forced on the two professions by legal enactments; the observance of the receipts and directions of such a work should always depend upon their intrinsic excellence and general expediency, or else they will necessarily be contravened, whenever it is deemed fit and reasonable.

As we before mentioned, the United States Dispensatory is divided into two parts, or into a consideration of the articles in their simple and compound forms. The short and necessarily imperfect treatise on chemistry, which is subjoined to most works of this character under the title of Elements of Pharmacy, has been judiciously omitted; the addition of such matter only swelling a volume, without being of any positive utility. By thus treating on the different articles in their commercial and pharmaceutical states, all the directions which have reference to the practical operations of the apothecary are found in one place, and are of more ready access, than if mingled with other matters.

"Under the head of materia medica, therefore, in this Dispensatory, we treat of medicines in the state only in which they are produced by nature, or come into the hands of the apothecary. Of these medicines, such as are recognised by our National Pharmacopœia are most minutely described; but we consider also all that are included in the officinal catalogues of the British Colleges, and some others which appear to deserve attention from their present form, or former reputation."

The authors have adopted an alphabetical arrangement, instead of attempting to class the different articles of the materia medica according to their supposed therapeutical or physiological effects on the human system; thus avoiding the difficult task of presenting a new classification of remedies, founded on the recent improvements in medical science, or of being obliged to consider the same substance under different heads, which although indispensable in a work on therapeutics is ill adapted for a book of reference; at the same time, when treating on each article, they have subjoined an account of its properties and remedial effects.

The plan pursued in describing the different substances is uniform; the officinal name being first given, which is as far as possible that recognised in the United States Pharmacopœia; this is followed by its English or vulgar name; next its definition, and its officinal synonymes in the three dispensatories of the British empire, to which is added its appellations in several foreign languages; these are succeeded by its classification as an object of natural history, with a succinct but well digested account of its habit, mode of growth, &c. We are then presented with its commercial history, properties and medical uses; this portion of the work is exceedingly valuable, and displays great research, acumen and judgment. To enable such of our readers, as have not seen the original to judge for themselves of the manner in which this is executed, we subjoin a specimen taken at random.

Ammoniacum, *U. S., Lond., Ed., Dub.*

Ammoniac.

"Heracleum gummiferum, Succus concretus. *The concrete juice.*" U. S.

"Gomme ammoniaque, *Fr.;* Ammoniak, *Germ.;* Gomma ammoniaco, *Ital.;* Goma amoniaco, *Span.;* Ushek, *Arab.;* Semugh velsherun, *Persian.*

"Much uncertainty has existed among botanists as to the plant which yields ammoniac. It was generally believed to be a species of *Ferula*, till Willdenow raised from some seeds mixed with the gum resin found in the shops, a plant which he ascertained to be an *Heracleum*, and named *H. gummiferum*, under the impression that it must be the true source of the medicine. On his authority, the plant has been adopted by the British colleges, and is recognised in our National Pharmacopœia. Willdenow expressly acknowledges that he could not procure from it any gum resin, but ascribes the result to the influence of climate. The *Heracleum*, however, does not correspond exactly with the representations given of the ammoniac plant by travellers; and Sprengel has ascertained that it is a native of the Pyrenees, and never produces gum. By this botanist it is named *H. pyrenaicum*, though before described by Lapeyrouse under the name of *H. amplifolium. (Merat and De Lens.)*

"Mr. Jackson, in his account of Morocco, imperfectly describes a plant indigenous in that country, supposed to be a species of *ferula*, from which gum ammoniac is procured by the natives; but it may be doubted whether its product is the true ammoniac of the shops, which is derived exclusively from Persia. Two English officers, Colonel Johnson and Captain Hart, have seen the real Persian plant, and given such imperfect accounts of it as might be expected from intelligent travellers, wholly ignorant of botany; M. Fontanier, a man of science, who was sent by the French government into the Levant, and resided many years in Persia, saw it growing in the province of Fars. By the last mentioned gentleman, a drawing of the plant with specimens was transmitted to Paris. From these it is inferred to be a species of ferula; and Merat and De Lens propose for it the name originally applied to it by

Lemery, of *F. ammonifera.* It would appear, however, from a very recent notice, that specimens of the plant obtained in Persia by Colonel Wright, and examined by Mr. David Don, prove it to belong to a genus allied to *Ferula*, but essentially different; and named by Mr. Don, *Dorema.* We are promised a description of it under the name of *D. ammoniacum*, in the transactions of the Linnæan society for the year 1831. *(Journ. de Pharm. Avril*, 1831.*)*

"The ammoniac plant grows spontaneously in Farsistan, Irauk, and other Persian provinces; in the southern districts of Arabia, and perhaps in the north of Africa. It attains the height of six or seven feet, and in the spring and early part of the summer abounds in a milky juice, which flows out upon the slightest puncture. From the accounts of travellers, it appears, that in the month of May, the plant is pierced by an insect of the beetle kind. The juice exuding, through the punctures, concretes upon the stem, and when quite dry is collected by the natives. M. Fontanier states that the juice exudes spontaneously, and that the harvest is about the middle of June. The gum resin is sent to Bushire whence it is transmitted to India. It reaches this country usually by the route of Calcutta. The name *gum ammoniac* is thought to have been derived from the temple of Jupiter Ammon in the Lybian desert, where the drug is said to have been formerly collected.

"*Properties.*—Ammoniac comes either in the state of separate tears, or in aggregate masses, and in both forms is frequently mixed with impurities. That of the tears, however, is preferable, as the purest may be conveniently picked out and kept for use. These are of an irregular shape, usually more or less globular, opaque, yellowish on the outside, whitish within, compact, homogenous, brittle when cold, and breaking with a conchoidal shining fracture.

"The masses are of a darker colour and less uniform structure, appearing when broken, as if composed of numerous white or whitish tears imbedded in a dirty-gray or brownish substance, and frequently mingled with foreign matters, such as seeds, fragments of vegetables and sand, or other earth.

"The smell of ammoniac is peculiar, and stronger in the mass than in the tears. The taste is slightly sweetish, bitter and somewhat acrid. The sp. gr. is 1.207. When heated, the gum resin softens and becomes adhesive, but does not melt. It burns with a white flame, swelling up, and emitting a smoke of a strong, resinous, slightly alliaceous odour. It is partly soluble in water, alcohol, ether, vinegar and alkaline solutions; more completely in the volatile oils, etherial spirit and ammoniated alcohol. Triturated with water, it forms an opaque milky emulsion, which becomes clear upon standing. The alcoholic solution is transparent, but is rendered milky by the addition of water. Braconnot obtained from 100 parts of ammoniac, 18.4 parts of gum, 70 of resin, 4.4 of a substance resembling gluten, *(bassorine,)* and 6 of water. The remainder was lost. A volatile oil, in minute proportion, is probably among the ingredients, as water distilled from ammoniac has its peculiar odour.

"*Medical properties and uses.*—This gum resin is stimulant and expectorant, in large doses cathartic, and like many other stimulants, may be so given as occasionally to prove diaphoretic, diuretic or emmenagogue. It has been employed in medicine from the highest antiquity, being mentioned in the writings of Hippocrates. The complaints in which it is most frequently used, are chronic catarrh, asthma, and other pectoral affections attended with deficient expecto-

ration without acute inflammation, or with too copious secretion from the bronchial mucous membrane dependent upon debility of the vessels. It is thought to have been useful in some cases of amenorrhœa, and in those chlorotic and hysterical conditions of the system arising out of this complaint. It has also been prescribed in obstructions or chronic engorgements of the abdominal viscera, under the vague notion of its deobstruent powers. Any good which it may do in these affections, is more probably ascribable to its revulsive action upon the alimentary mucous membrane. Authors speak of its utility in long and obstinate colics dependent on mucous matter lodged in the intestines; but it would be difficult to ascertain in what cases such mucous matter existed, and, even allowing its presence, to decide whether it was a cause or a result of the diseased action. Ammoniac is usually administered in combination with other expectorants, with tonics or emmenagogues. It is much less used than formerly. Externally applied in the shape of a plaster, it is thought to be useful as a discutient or resolvent in white swellings of the joints and other indolent tumours. (See *Emplastrum ammoniaci.*)

"It is given in substance, in the shape of pill or emulsion. The latter form is preferable, (See *Mistura ammoniaci.*) The dose is from ten to thirty grains.

"*Off. Prep.*—Emplastrum ammoniaci, *U. S.*, *Lond.*, *Ed.*, *Dub.* Emplastrum ammoniaci cum Hydrargyro, *Lond.*, *Dub.* Emplastrum gummosum, *Ed.* Mistura ammoniaci, *U. S.*, *Lond.*, *Dub.* Pillulæ scillæ compositæ, *Lond.*, *Ed.*, *Dub.*"

Such is the manner in which the authors have treated on the different articles of the materia medica, and although there is nothing new in the plan, it will at once be perceived by every one acquainted with the different dispensatories, that the present is much fuller and more precise in its details, and that the information conveyed is brought up to the present state of science. This in fact, is the great desideratum in a work of this character. The apothecary and physician have been in want of a book of reference to which they could confidently refer, for the latest improvements in science; the opinions of the early writers are now of little practical importance, however interesting they may be to the antiquary or man of letters.

As before observed, Drs. Wood and Bache have closely followed the National Pharmacopœia in their pharmaceutical nomenclature; which is certainly one of the best now used in such works, though even this, we think is deficient in many particulars. The attempt that has been made to adapt the language of pharmacy, to every change of names in chemistry and natural history has been of serious disadvantage, and has created confusion and uncertainty instead of the precision that was anticipated. Hence although the revisers of our National Pharmacopœia have done much, they did not go far enough, and instead making a radical reform, they have been content with partial alterations.

As an example of the evils attendant on an attempt to adapt the

nomenclature of pharmacy to the constant changes which are daily made in the scientific names of other sciences, we need only advert to corrosive sublimate, which after having successively borne the appellations of *Murias hydrargyri corrosivus*, *Murias hydrargyri oxydatus preparatus*, *Hydrargyrum muriaticum corrosivum*, *Murias hydrargyri*, *Murias hydrargyri super-oxygenatus*, *Hydrargyri oxymurias*, *Deuto-chloruretum hydrargyri*, is finally presented to us as *Hydrargyrum chloridum corrosivum*. The same variations have taken place in the names of substances derived from the vegetable and animal kingdoms; thus the Spanish fly after having in turn been *Cantharis*, *Meloe*, and *Lytta*, is again permitted to assume the appellation of *Cantharis;* and Cardamoms has appeared in the different Pharmacopœias as *Amomum*, *Elettaria*, *Matonia*, and has now, and we hope finally, been found to belong to the genus *Alpinia*. On the other hand, substances derived from more than one vegetable are all referred to one species, and that perhaps a different one, according to the authority consulted.

This state of things has been strongly felt, and has engaged the attention of many distinguished men, among the rest Hufeland has written an address to physicians on the necessity of adhering to the officinal name of drugs, a sentence from which we will quote as perfectly accordant with our own views on this subject. "Le mal est urgent, et menace de s'etendre de jour en jour. Il est tems d'y mettre un terme. Le remede est facile; il ne tient qu'a nous d'en faire usage, et j'ai cru devoir prendre la parole et de traiter la chose publiquement, afin de solliciter et d'obtenir l'attention et l'assistance de mes collegues. Il ne faut pour cet effet que la reunion de tous les medicins praticiens et académiciens, et de leur part l'engagement inviolable, de se servir dans leurs ordonnances que des anciens termes."

As, however, such a combination can scarcely be expected to take place, it is the more incumbent on those who appear as the leaders in pharmaceutical science, not to stop at half way measures, but to boldly adopt a uniform nomenclature and to adhere to it strictly, regardless of the changes that may occur in the phraseology of chemistry and natural history. Their example will sooner or later be followed, and we shall, at least, have a simple language, not overwhelmed with long lists of synonymes.

In turning over the pages of the United States Dispensatory, we made some notes and observations on what appeared new, or on which we differed from the learned authors; these are of course of a desultory character, as to attempt a critical analysis of each sub-

ject would require more time and science than we can bring to the task.

Acetum.—In the account of the manufacture of this article, we were surprised to find that the various methods by which vinegar is made in large quantities, both in this country and Europe in forty-eight hours to four days, have not been noticed. No inconsiderable proportion of the weak vinegars used for certain manufacturing purposes in this city, are made from a combination of potatoe juice, malt and whiskey.

Acidum arseniosum.—This is well treated on, but we are sorry that the authors were not able to avail themselves of the series of well conducted experiments on arsenic, and some of its compounds lately published by Dr. MITCHELL and Mr. DURAND, which correct many erroneous statements as regards the volatility, solubility, &c. of this perplexing substance. In their medico-legal observations on this and other poisons, we are glad to see that they extract largely from the excellent work of Dr. CHRISTISON.

Acidum muriaticum.—In retaining this name, instead of using the term *Acidum hydrochloricum*, the authors have followed other authorities, but we think they have conceded too much in this, particularly as they admit the compounds of chlorine and the alkalies under the appellations of chlorides, when in a dry state, whilst in solution, they term them muriates; this makes a confusion in the nomenclature that might have been avoided. Not that we object to the term *Acidum muriaticum*, for, as we before observed, we are of opinion that no good has resulted in pharmacy by change of names, but as the term chlorine is universally adopted, its compounds should also bear the family appellation.

Acidum nitricum.—The following correction of an error is important:—

"We have stated above, that the red acid of the Edinburgh College is erroneously called nitrous acid. It is in fact, nitric acid holding nitric oxide in solution. Indeed, the acid of the other colleges is, to a certain extent, of the same nature, as it is generally yellow from the presence of a small quantity of the same gas. Real nitric acid is perfectly colourless. Nevertheless, it may be proper to add, that according to the equivalent numbers, if we suppose two equivalents of nitric acid, united to one equivalent of nitric oxide, the compound would correspond to three equivalents of nitrous acid."

Acidum oxalicum.—To the list of substances that contain this acid in considerable quantities, may be added the sumach, the efflorescence on the berries of which, is composed of super-oxalates, and malates of potash and limes.

Aloe.—This article displays great research and judgment on the part of the authors, and we should be tempted to lay it before our readers, were it not for its length. Do they not, however, go too far in saying, that "very little hepatic aloes comes to this country;" we have repeatedly met with it not only under this name, but also when of a good quality under that of socotrine.

Alumen.—The following may be new to most of our readers:—

"Alum has not been an article of import into the United States since 1818, or a year or two earlier, the demand since then having been entirely supplied by the domestic manufacture. There are at present six establishments in the United States where alum is manufactured; namely, two in Baltimore, one in New York, and three in Massachusetts, at Salem, Roxbury and Newton. The aggregate quantity made in these works, may be estimated at from a thousand to twelve hundred tons. The method employed consists in the direct combination of sulphuric acid with clay. Lately, however, Messrs. Tyson and Ellicott, manufacturing chemists of Baltimore, have commenced working the ore found at Cape Sable, on Magothy river, Maryland. This ore, which was extensively worked during the late war, under the superintendance of Dr. Troost, consists of lignite, clay, sulphuret of iron and sand. It exists in beds of from six to ten feet in thickness, covered by a stratum of sand. It is dug up and thrown in heaps of from one to three thousand tons, is set on fire and continues to burn for years. The ashes are transported to the manufactory, where they are lixiviated and evaporated in leaden vessels. When the solution indicates about 25° of Baume's hydrometer, sulphate of potassa is added, after which it is drawn off to crystallize. At the end of about a week, the crystallization having been completed, the mother waters are pumped off, and the crystals, after being washed and drained, are dissolved in leaden boilers. From these the solution is transferred to the refining vessels, and left for about three weeks to crystallize."

Antimonium.—The authors have adopted, we perceive, the current belief, that it is to Basil Valentine that we are indebted for the general introduction of this metal and its compounds as a medicinal substance; but it has been most satisfactorily proved that the *Carrus triumphalis antimonii* was not published till long after his death, and appears to have been written by a disciple of the celebrated Paracelsus.

Argentum.—Under this head it is stated that the process for obtaining the silver from the ores is somewhat similar to that pursued at Freyberg; we have always been led to believe that it differed in almost every particular; at all events, the ores of South America have been more successfully worked by the natives, than by the German miners sent out there.

Asclepias.—We find it stated, the *A. incarnata* and *A. syriaca* possess properties similar to those of *A. tuberosa*, is not this an over-

sight? the latter species is peculiar from its affording none of the acrid milky juice, so plentiful in the others, and which allies them to the apocynum in therapeutic effects.

Barytæ carbonas.—Is it not an error to say that it has not been found in the United States? SILLIMAN, Vol. II. p. 374, on the authority of RAFINESQUE, states that it occurs in large quantities near Lexington, in Kentucky. The same remark may be made as regards bismuth; this metal being found at other localities besides that mentioned.

Brominum.—The account of this new medical agent is interesting, though we doubt if it will ever be extensively used; further experiments with it can only determine its true rank as a therapeutic agent. The bromide of iron, from what we have seen of it, appears exceedingly analogous in every particular to the hydrochlorate.

Calamus.—We observe that it is said this root "was in high repute among the ancients, and its virtues are celebrated in the works of PLINY and DIOSCORIDES." What plant furnished the calamus of the ancients is extremely uncertain, and the research has occupied the attention of some of the most learned pharmaceutists of Europe, but as yet their labours have been attended with any thing but satisfactory results.

Lapilli cancrorum.—Under the names of crab's eyes, we not only find the gastric concretion spoken of, but also the calcareous opercula of some marine shells. This fraud is of no consequence, as the composition of both is almost identical.

Calcis chloridum.—This subject is ably treated on, though the later experiments on the chlorides of oxides have thrown much light on their composition and habitudes.

Chenopodium.—For medical uses there appears to be very little difference between the *C. anthelminticum* and *C. ambrosiodes*, and we know that they are indiscriminately used by the preparers of the wormseed oil.

Cahinca.—As this has never before appeared in our Dispensatories, and has attracted much attention from its reputed virtues in dropsy, it may be interesting to our readers to have a short abstract of the account of it given by Drs. Wood and Bache.

It appears that this medicine is furnished by several species of the genus Chiococca, all natives of South America; hence the external characters of it as found in commerce, are subject to slight variations. The root is the part employed. This is of a reddish-brown colour, and consists of cylindrical pieces, from the thickness of a straw to that of the little finger, somewhat bent or contorted, slightly striated longitudinally, presenting at certain distances small, irregular tubercles. The cortical portion, which is of a resinous character, has a

bitter disagreeable taste, somewhat acrid and astringent; the ligneous portion is tasteless. The medical virtues of the root are almost exclusively confined to the cortical portion. They are extracted by water and alcohol.

Cahinca is tonic, diuretic, purgative and emetic. In Brazil it has long been used as an antidote against the bites of venomous snakes. But it owes its celebrity to its powers in the cure of dropsy, in which it is considered by some practitioners as superior to all other remedies. It is employed in substance, decoction, extract or tincture.

Cinchona.—The article on cinchona is more than usually extensive, and embodies a mass of information on the natural and commercial history of the drug of great interest and value, which we should be glad to transfer to our pages, were it not for its great length, we must therefore be content with recommending it as the most satisfactory account of this important drug, that has yet appeared. The same remarks are applicable to our authors description of the cinnamon, with which they have properly incorporated that of cassia, which, as it appears in our market, is certainly in many instances true cinnamon, added to which, there is no absolute criterion by which they can be separated, more especially as respects their medical properties.

Digitalis.—The following remark respecting this drug is worthy of attention, and is applicable to many of the more delicate vegetable remedies thus prepared. Much of the medicine kept in our shops is obtained from the settlement of the Shakers in New York, and is in the state of oblong compact masses, into which the leaves are probably compressed, before they are thoroughly dried; at least the cakes when opened are not unfrequently found to be somewhat mouldy. This mode of preparing the drug is highly objectionable, and it is not surprising that our practitioners are so frequently disappointed in its effects.

Euphorbia.—We would draw the attention of the authors to another native species of this genus, the *E. hypericifolia* which differs essentially in its properties from those described by them, and which if it should be found on a more extensive trial to warrant the eulogies bestowed on it, will be well worthy of a place in their next edition.

Ferri ferrocyanas.—With regard to the remedial properties of this article in intermittent fevers, we are more than sceptical, from the actual employment of it in the treatment of a great number of cases of this disease, during its prevalence several years since. In these instances the variety recommended by Dr. Zollickoffer was used. It has also proved inefficacious in the hands of many other practitioners in this city and elsewhere.

Fucus.—Instead of the *F. vesiculosus*, would it not have been more advantageous to have given the *F. helminthochortos.* The first of these has no peculiar advantage over any other marine plant containing iodine in small quantities, whilst the latter maintains a high rank among the European anthelmintics.

Gambogia.—A variety of this drug sometimes appears in our market, which betrays evidences of a different preparation, if not of a different origin from that described by Drs. Wood and Bache. This in cakes with a convex bottom, having a dull and granular appearance.

Ichthyocolla.—The following respecting the preparation of Isinglass in the United States will probably be new to most of our readers.

"Isinglass of good quality is now obtained in New York, from the weak fish, and perhaps others caught in the neighbourhood. The sounds are dried whole, or merely slit open, and vary much in size and texture, weighing from a drachm up to an ounce. Another kind of inferior quality is prepared in New England, probably from the intestines of a fish. It is in the form of thin ribbands several feet in length, and from an inch and a half to two inches in width. It has been used to a considerable extent in this country, but is less soluble than the Russian, and affords a dark coloured solution."

The articles on *ipecacuanha* and jalap evince much research and discrimination, particularly the latter.

Litmus.—Cudbear is prepared not only from the *Lichen tartareus*, but also from many other species, which are not only procured in the north of Europe, but also in Labrador and other countries.

Manna.—From a recent account, it appears that another kind of manna has been discovered in New Holland, this is the product of the *Eucalyptus mannifera*, each tree of which produces several pounds. It resembles the manna of Europe except that it is less nauseabond.

The general observations on the fixed and volatile oils are useful, but we do not conceive that the rules given for the detection of the adulterations so often practised, particularly as regards the latter. This subject requires a close examination and repeated experiments.

Palm oil.—The authors are in all probability correct in attributing the origin of most of the palm oil used in the United States to the *Elais guiniensis*, though there is no doubt but that the *Elais (cocos) butyracea* and other species of palms also furnish some of that imported.

Oleum tiglii.—The authors have fallen into an error as respects the seeds furnished to them by Dr. Burroughs. These were not the produce of a different species of croton, but of the *Jatropha curcas*, which is also a native of South America.

Opium.—This article is copious and well drawn up, though we think

that it is deficient in the descriptions of the various kinds of opium of commerce. Much interesting information on this head will be found in a memoir by M. GUIBOURT in the *Journ. de Pharm. Dec.* 1831.

Panax quinquefolium.—From the laborious investigations recently undertaken with regard to the ginseng, it appears that the root or roots so highly esteemed by the Chinese, are not furnished by the *Panax quinquefolium*, and that this article has been only used as a substitute for them. The authors should have noticed that considerable quantities of this drug are prepared for the Chinese market by being clarified, in which state it commands a higher price.

Prunus virginiana.—The wild cherry bark of our shops is derived not only from the *P. virginiana*, but also from the *P. serotina* a closely allied species.

Rheum.—We have been highly gratified with the manner in which this subject is treated, and are sorry that our limits will not permit our transferring it to our pages.

Rhus glabrum.—We perceive that the authors have inadvertently quoted Dr. FAHNESTOCK of Lancaster as the author of articles in this Journal, on the medical effects of the *Rhus glabrum* and *Myrica cerifera;* this is an error, they are due to Dr. WILLIAM M. FAHNESTOCK of this city.

Madder.—From some late experiments of MM. GAULTIER DE CLAUBRAY and PERSOZ, it would appear that the colouring matters obtained by former chemists are not the true colouring principles of this drug. Instead of the alizarin and xanthin they have produced a red colouring principle differing from the former, and a splendid rose-coloured substance, that is likely to be very useful in the arts.

Scammonium.—We would advise an attentive perusal of the observations on the distinguishing marks of the different substances which come to our market under this name. As is observed, the Aleppo scammony seldom reaches us in its purest state; in confirmation of this remark of the authors, we would state that we searched the shops in this city in vain for an article answering to the description given of this article.

Senna.—This is admirably treated on, and will amply repay the reader for any attention he may bestow on it. We think, however, that the authors have adopted an erroneous plan in considering *Cassia fistula* and *C. marilandica* under the head of cassia, and the other officinal species under that of senna, it would have been better in every point of view to have classed the indigenous species with the sennas, by adopting RICHARD's genus *Cathartocarpus* for the *C. fistula*, or to have placed the sennas in GÆRTNER's genus of that name.

The second part of the work as before stated is devoted to the con-

sideration of medicines in their compound form, and is of far more interest to the apothecary than to the physician, though it is replete with information that will be found useful to every medical man; our limits, however, will not permit us to attempt even a cursory examination of it at this time. We deem it due to the authors, at the same time to state, that as far as we have been able to judge, it bears the marks of the same research and discrimination as the first. It contains all the formulæ of the three colleges of Great Britain in addition to those of our own Pharmacopœia, with copious observations on the processes as well as on the medical properties of the preparations.

It only remains for us at present to speak of the mechanical execution of the work. With this we have no fault to find, the number of typographical errors are remarkably few for a treatise of this character, and are principally of such a nature, as to be of little essential consequence; the only objection we have is to its great bulk. That *sine qua non* of a book, the index, is extremely copious and well arranged.

In conclusion we have only to say, that we are fully convinced that no one that consults the pages of this work will be disappointed; whether his object be the acquisition of a general knowledge of the articles of the materia medica, or information on the complex manipulations of pharmacy. R. E. G.

Art. VII. *Change of Air, or the Philosophy of Travelling: being Autumnal Excursions through France, Switzerland, Italy, Germany and Belgium; with Observations and Reflections on the Moral, Physical, and Medicinal Influence of Travelling Exercise, Change of Scene, Foreign Skies, and Voluntary Expatriation. To which is prefixed Wear and Tear of Modern Babylon.* By James Johnson, M. D. Physician Extraordinary to the King. London, 1831. pp. 294. 8vo.

We take some degree of blame to ourselves for not having noticed the volume before us at an earlier period. Although intended, apparently, for the general reader chiefly, it embraces numerous topics of considerable interest to the physician, and on which he is often called to give an opinion, without being always conversant with all the bearings of the subject. How frequently, for instance, is he consulted by the anxious relatives of the consumptive regarding the

comparative advantages of various climates;—the southern regions of our own states—the West India islands, or the south of France and Italy; and how often found totally unprepared to give a satisfactory answer? As regards those European countries, the author of the volume before us is capable of expressing himself from personal observation; and in the course of our remarks we shall take occasion to offer a few hints regarding the climate of different parts of this continent, which may serve, so far as they go, as elements for the guidance of the physician.

Dr. Johnson is, doubtless, well known to most of our readers as the able author of a treatise on the '*Diseases of Tropical Climates;*' and of various publications on subjects connected with his profession; but still more as the Editor of the *Medico-Chirurgical Review and Journal of Practical Medicine*—one of the most successful journals on medical science which have ever been published in Great Britain; more perhaps on account of its method of analyzing, and of the zeal and industry of the author in collecting and arranging facts, than from any unusual ability displayed in its pages. They, who have perused the treatise on tropical diseases, are familiar with the style and character of his writings, all of which indicate great good sense, but they are too frequently bedaubed and betinseled with tawdry ornament to a degree that becomes almost nauseating. The work before us is signally faulty in these respects. There is a perpetual straining after metaphor and meretricious embellishment, so that the mind becomes glutted in spite of the banquet of useful information spread before it; and notwithstanding the introduction of several old college acquaintances, with whom the reader was wont, at one time, to be sufficiently delighted, such as—"Gutta cavat lapidem non vi sed sæpe cadendo"—"Viresque acquirit eundo"—"O fortunatos nimium si sua bona norint"—"Quem Deus vult perdere prius dementat"—"Quicquid agunt homines, votum, timor, ira, voluptas"—"Expellas naturam furca tamen usque recurrit," &c. &c.

No opportunity for introducing a scrap of Latin or a quotation from a modern poet, is suffered to pass by. Shakspeare, Goldsmith, and Pope, appear to be the author's favourites, but he occasionally descends to less elevated bards, as where he asserts that—

"The misery inflicted on the immense class of peripatetics in Paris, by the sharp stones of the pavé, continually reminds one of the tortures experienced by Peter Pindar's Pilgrim, while hobbling along the road—

'Damning the souls and bodies of the peas'

With which his shoes were filled as a penance for his sins;"—

Where we have too evident indications of the train laid for the in-

troduction of the line from honest Peter;—or when he affirms that—

"In Geneva a pair of pattens and an umbrella serve for carriage and horses—while the housemaid, who has assisted to dress her mistress, performs the office of footman, in conducting her to the *soirée. There* conversation is enlivened and sweetened by music, tea, and bon-bons—the gentlemen, in groups, discussing foreign or domestic politics—while the stranger, from nine till twelve o'clock, has the supreme felicity to—

'Hear the pretty ladies talk
Tittle tattle, tittle tattle,
Like their pattens as they walk,
Prittle prattle, prittle prattle.' "

Which description of Genevese society is too palpably introduced for the purpose of getting rid of this sublime effort of the muses, as no one is better aware than Dr. Johnson that the description is equally applicable to the society of every small town and village in Great Britain. Instead of looking upon these quotations as ornaments, we regard them to be undoubted blemishes, and by no means creditable to the author's taste.

As some evidence of his rage for what, in North Carolina, is not inappropriately termed *superflostication*, we may remark, that we have taken the trouble to count the scraps of poetry to be found in this small octavo, and we find that they amount to *one hundred and six!*

It is not our intention to follow the author in his "autumnal excursion," which affords much food for instruction and entertainment to the general reader, especially to travellers who have visited the countries he describes, or are about to do so. We can only select those topics, which are more particularly of a professional nature. The work is divided into three parts:—the first embracing the *influence of avocation and education on health, with a description of the salutary effects of travelling exercise:* the second comprising the *excursion, &c.*; and the third being devoted to the *influence—moral, physical and medicinal—of an Italian climate and Italian residence in sickness and in health.*

At the outset of the first part we have an elaborate description of "a condition or state of body and mind, intermediate between that of sickness and health, but much nearer the former than the latter," and which the author has quaintly yclept '*wear and tear complaint.*'

"It is daily," he observes, "and hourly felt by tens of thousands in this metropolis, (London,) and throughout the empire; but I do not know that it has ever been described. It is not curable by physic, though I apprehend that it makes much work for the doctors ultimately, if not for the undertakers. It is that WEAR AND TEAR of the living machine, mental and corporeal, which results

from over-strenuous labour or exertion of the intellectual faculties, rather than of the corporeal powers, conducted in anxiety of mind and in bad air." * * * "It cannot be necessary to minutely describe that WEAR AND TEAR of the *moral and the physique*, which is too widely felt not to be readily recognised. The experienced eye detects it at a single glance in every street, in almost every habitation—in the senate and in the theatre—at the bar and at the altar—in the cabinet, the court: in short, in every spot where art, science, literature, or civilization can be found. One of the most striking features of this state is that which, indeed, would be, *a priori*, expected—PREMATURE AGE."

This premature age, with its accompaniments—a care-worn countenance, and a state of "etiolation or blanching" of the complexion, the author considers to be, amongst the thinking part of the community, symbols or symptoms of WEAR and TEAR of constitution, and he favours us with an episode to exhibit the "reciprocities of mind and body," or in other words, the powerful influence which they mutually exert upon each other. The following extract will show the notions he possesses regarding the effects of great intellectual and moral exertion.

"It is by the brain, or organ of intellect, that man is distinguished and raised above all other animals. The nerves of sense, by which impressions are conveyed to this organ, are not so acute in the lord of the creation as in many of the inferior orders of animated beings. He is surpassed by the eagle in sight—by the hare in hearing—and by almost all other animals in *taste*. But when the human species began to congregate in cities, it was soon obvious that the exertion of the *intellect* must predominate over that of the body. As civilization advanced, intellectual labour came more into demand, and the labourers multiplied in proportion. At the present period, as was before observed, the employment of a very large class of human beings, especially in cities, consists almost entirely of mental exertion. To such an extent is intellectual labour now arrived, that a very large and influential class of society live entirely, and support themselves honourably, by "teaching the young ideas how to shoot"—while others, who have no actual occupation, rack their minds with inventions, schemes, and projects, that fade away as fast as they are engendered.

"It is well known that the more a voluntary muscle is exercised, within a reasonable limit, the stronger and more capable of exertion it becomes. It is so with the intellectual faculties. The more these faculties are brought into play, *(within a certain bound of moderation,)* the more extensive becomes the sphere of their power. The senses of touch, smell, hearing, all acquire acuteness in proportion as they are exercised. But this extra development and sensibility of the intellectual faculties cannot take place but at the expense of some corporeal function or structure. An attentive examination of every class of society from the prime minister down to the attorney's clerk, will convince us that, in proportion as the intellect is highly cultivated, improved, and strongly exerted, the body suffers—till a period at length arrives, when the corporeal deterioration begins to reäct on the mental powers, and then proud man finds that the elasticity, even of the immortal mind, may be impaired by pressure too

long continued—and that, like springs of baser metal, it requires occasional relaxation.

"Civilized, and more especially CIVIC life, by rendering the senses more acute, makes the passions more ungovernable. In congregated masses of society, every kind of food for the passions is not only superabundant in quantity, but of the most stimulating quality. Hence, in all the upper classes of society—in all indeed, who work with the head rather than with the hand—and also among those who have no work at all—we find an unnatural and insalutary degree of excitement kept up in the brain and nervous system by the "play of the passions." The extent of injury which our health sustains in this way is beyond all calculation! Plato was not very far wrong when he asserted, that "all diseases of the body proceed from the mind or soul:"—"omnia corporis mala ab anima procedêre." Unquestionably a very great proportion of them originate in this source. In this country, where man's relations with the world around him are multiplied beyond all example in any other country, in consequence of the intensity of interest attached to politics, religion, commerce, literature, and the arts—where the temporal concerns of an immense proportion of the population are in a state of perpetual vacillation—where spiritual affairs excite great anxiety in the minds of many—and where speculative risks are daily run by all classes, from the disposers of empires in Leadenhall Street down to the potatoe-merchant in Covent Garden, it is really astonishing to observe the deleterious influence of these mental perturbations on the functions of the corporeal fabric. The operation of *physical* causes, numerous as these are, dwindles into complete insignificance, compared with that of anxiety, tribulation, discontent—and I may add ENNUI of mind."

We cannot accord with Dr. Johnson in his estimate of the injurious effects of mental labour when carried only to the extent he describes. It has been our lot to be placed for a number of years amongst many whose intellectual meditations have been long and profound; and, as a general principle, they have appeared to us to be unusually healthy, and to present no more of those indications of what he calls the WEAR *and* TEAR *complaint*, than others whose avocations have been of a different character. It has indeed been often remarked, that the studious are more healthy and more longevous than their fellow men, and we have no doubt of the correctness of the affirmation. No country affords so long a list of laborious students, amongst the professors in its literary institutions, as Germany, yet they have been signalized for their longevity. The various concomitants of civic life to which the literati are much exposed—the late hours, the conversion of day into night, the indulgences of the table, and the crowded saloon, afford a more satisfactory explanation of the premature old age, the etiolation, &c. than the inadequate cause which the author has assigned. We would by no means assert that undue exertion of the mind never induces bodily disease, but we believe that such a result is less common than is imagined, and fre-

quently the cause is far more manifest, although it may be consolatory to the friends of the sick to have the disease ascribed to such agency. The impure air of cities is proved to be positively injurious to man, by the much greater number of children who die there than in the country, and its agency in the production of effects, which the author has described as arising from other causes, is strikingly exhibited by the rapid improvement in the general feelings—in the *cœnæsthesis*, as the Germans calls it—the *corkiness* and buoyancy of the frame, and the ruddiness and clearness of the complexion, when the citizen breathes for a short time the pure, invigorating air of the country.

"Let any one," says the author, "who has a month to spare in the autumn, take his daily seat on the further extremity of the Chainpier at Brighton, and examine the features of the numerous faces which present themselves on the platform there. He must note the individual countenances. He will perceive these individuals, at first pale and sickly, gradually improve in their looks, and at length disappear—the chasms perpetually filled up by importations from MODERN BABYLON."

The salutary effects of travelling exercise are dwelt on at much length by the author, and as his descriptions may be looked upon as, in some measure, the experience of an invalid in search of health, they are, on that account, worthy of more attention.

"What I am going to say on this subject," he remarks, "is the result of direct personal experience and observation, in Europe, and in almost every quarter of the globe, unbiassed by any preconceived opinions derived from books or men."

After depicting the chief "*moral effects*" of travelling exercise, in producing a greater degree of serenity or evenness of temper than was previously possessed, and in removing depression of spirits or mental despondency, he thus describes the physical effects of the combination of mental and corporeal exercise resulting from travel upon the bodily functions:—

"The first beneficial influence of travelling is perceptible in the state of our corporeal feelings. If they were previously in a state of morbid acuteness, as they generally are in ill heath, they are rendered less sensible. The eye, which was before annoyed by a strong light, soon becomes capable of bearing it without inconvenience; and so of hearing, and the other senses. In short, morbid sensibility of the nervous system generally is obtunded, or reduced. This is brought about by more regular and free exposure to all atmospheric impressions and changes than before, and that, under a condition of body, from exercise, which renders these impressions quite harmless. Of this we see the most striking examples in those who travel among the Alps. Delicate females and sensitive invalids, who, at home, were highly susceptible of every change of

temperature and other states of the atmosphere, will undergo extreme vicissitudes among the mountains, with little inconvenience. I will offer an example or two in illustration. In the month of August, 1823, the heat was excessive at Geneva and all the way along the defiles of the mountains, till we got to Chamouni, where we were, at once, among ice and snow, with a fall of 40 or more degrees of the thermometer, experienced in the course of a few hours, between midday at Salenche, and evening at the foot of the Glaciers in Chamouni. There were upwards of fifty travellers here, many of whom were females and invalids; yet none suffered inconvenience from this rapid atmospheric transition. This was still more remarkable in the journey from Martigny to the great St. Bernard. On our way up, through the deep valleys, we had the thermometer at 92° of reflected heat for three hours. I never felt it much hotter in the East Indies. At nine o'clock that night, while wandering about the Hospice of the St. Bernard, the thermometer fell to six degrees below the freezing point, and we were half frozen in the cheerless apartments of the monastery. There were upwards of forty travellers there—some of them in very delicate health; and yet not a single cold was caught, nor any diminution of the usual symptoms of a good appetite for breakfast next morning.

"This was like a change from Calcutta to Melville Island in one short day! So much for the ability to bear heat and cold by journeying among the Alps. Let us see how hygrometrical and barometrical changes are borne. A very large concourse of travellers started at day-break from the village of Chamouni to ascend the Montanvert and Mer de Glace. The morning was beautiful; but before we got two-thirds up the Montanvert, a tremendous storm of wind and rain came on us, without a quarter of an hour's notice, and we were drenched to the skin in a very few minutes. Some of the party certainly turned tail; and one hypochondriac nearly threw me over a precipice, while rushing past me in his precipitate retreat to the village. The majority, however, persevered, and reached the Chalet, dripping wet, with the thermometer below the freezing point. There was no possibility of warming or drying ourselves here; and, therefore, many of us proceeded on to the Mer de Glace, and then wandered on the ice till our clothes were dried by the natural heat of our bodies. The next morning's muster for the passage over the Col de Balme showed no damage from the Montanvert expedition. Even the hypochondriac above-mentioned regained his courage over a bottle of Champagne in the evening at the comfortable 'Union,' and mounted his mule next morning to cross the Col de Balme. This day's journey showed, in a most striking manner, the acquisition of strength which travelling confers on the invalid. The ascent to the summit of this mountain pass is extremely fatiguing; but the labour is compensated by one of the sublimest views from its highest ridge, which the eye of man ever beheld. The valley of Chamouni lies behind, with Mont Blanc and surrounding mountains apparently within a stone's throw, the cold of the Glaciers producing a most bracing effect on the whole frame. In front, the Valley of the Rhone, flanked on each side by snow-clad Alps, which, at first sight, are taken for ranges of white clouds, presents one of the most magnificent views in Switzerland, or in the world. The sublime and the beautiful are here protended before the eye, in every direction, and in endless variety, so that the traveller lingers on this elevated mountain pass, lost in amazement at the enchanting scenery by

which he is surrounded on every point of the compass. The descent on the Martigny side, was the hardest day's labour I ever endured in my life—yet there were three or four invalids with us, whose lives were scarcely worth a year's purchase when they left England, and who went through this laborious, and somewhat hazardous descent, sliding, tumbling and rolling over rocks and through mud, without the slightest ultimate injury. When we got to the goatherds' sheds in the valley below, the heat was tropical, and we all threw ourselves on the ground and slept soundly for two hours—rising refreshed to pursue our journey.

"Now these and many other facts which I could adduce, offer incontestible proof how much the morbid susceptibility to transitions from heat to cold—from drought to drenchings—is reduced by travelling. The vicissitudes and exertions which I have described, would lay up half the effeminate invalids of London, and kill, or almost frighten to death, many of those who cannot expose themselves to a breath of cold or damp air, without coughs or rheumatisms, in this country.

"The next effect of travelling which I shall notice, is its influence on the organs of digestion. This is so decided and obvious, that I shall not dwell on the subject. The appetite is not only increased; but the powers of digestion and assimilation are greatly augmented. A man may eat and drink things while travelling, which would make him quite ill in ordinary life.

"These unequivocally good effects of travelling on the digestive organs, account satisfactorily for the various other beneficial influences on the constitution at large. Hence dyspepsia, and the thousand wretched sensations and nervous affections thereon dependent, vanish before persevering exercise in travelling, and new life is imparted to the whole system, mental and corporeal. In short, I am quite positive that the most inveterate dyspepsia, (where no organic disease has taken place,) would be completely removed, with all its multiform sympathetic torments, by a journey of two or three thousand miles through Switzerland, Germany, or any other country, conducted on the principle of combining active with passive exercise in the open air, in such proportions as would suit the individual constitution and the previous habits of life.

"There is but one other effect of travelling to which I shall allude, before I close this section; but I think it is a very important one—if not the most important of all. It is the influence which *constant change of air* exerts on the blood itself. Every one knows the benefits which are derived from change of air, in many diseases, when that change is only from one part to another, a few miles separated. Nay, it is proved, beyond all possibility of doubt, that the change from what is considered a good, to what is thought a bad air, is often attended with marked good effects. Hence it is very reasonable to conclude, that the *mere change* of one kind of air for another has an exhilarating or salutary effect on the animal economy. It is true, that we have no instruments to ascertain in what consists this difference of one air from another, since the composition of the atmosphere appears to be nearly the same on all points of earth and ocean. But we know, from observation, that there are great differences in air, as far as its effects on the human frame are concerned. Hence it would appear that the individual, confined to one particular air, be it ever so pure, languishes at length, and is bettered by a change. The idea is sup-

ported by analogy. The stomach, if confined to one species of food, however wholesome, will, in time, languish and fail to derive that nutriment from it, which it would do, if the species of food were occasionally changed. The ruddy complexion then of travellers, and of those who are constantly moving from place to place, as stage-coachmen, for example, does not, I think, solely depend on the mere action of the open air on the face, but also on the influence which change of air exerts on the blood itself in the lungs. I conceive, then, that what Boerhaave says of exercise, may be safely applied to change of air. 'Eo magis et densum, et *purpureum sanguinem esse*, quò validius homo se exercuerit motu, musculorum.' It is to this *constant change of air*, as well as to the constant exercise of the muscles, that I attribute the superiority of the plan of travelling which I have proposed, over that which is usually adopted—where HEALTH is the entire object. On this account, I would recommend some of my *fair* countrywomen, (who have leisure as well as means,) to improve the languid states of their circulation, and the delicacy, or, more correctly speaking, the pallor of their complexions, by a system of exercise in the open air, that may give colour to their cheeks, firmness to their muscles, tone to their nerves, and energy to their minds."*

The following remark we consider altogether hypothetical:—

"The other effect of travelling is very curious, and has not been noticed, so far as I am acquainted, by any writer. It is this—that the exercise of body, taken on the road, or while wandering about seeing objects of curiosity, is not favourable to intellectual operations. It is probable that a high range of health, indeed, is incompatible with the most vigorous exertion of the mind, and that this last both requires and *induces* a standard of health somewhat below par. It would not be difficult to show that the majority of those who have left behind them imperishable monuments of their intellectual powers and exertions, were people of weak bodily health. Virgil, Horace, Voltaire, Pope, and a thousand others might be quoted in illustration."

This inference, from insufficient data, appears to have been suggested by a circumstance which admits of easy explanation; for he adds—

"Be this as it may, it is certain that travelling exercise, while it so much improves all the bodily functions, unhinges and unfits the mind, *pro tempore*, for the vigorous exercise of its higher faculties. I much doubt whether the immortal effusions of Byron were penned immediately after the impressions were made on his mind by the Rhine, the Alps, the lakes of Helvetia, the ruins of Italy and Greece, with all their classical and historical associations. But the first excitement being over, the memory of scenes and circumstances, together with the reflections and recollections attendant thereon, furnish an ardent mind with rich materials and trains of thought, that may, by gifted individuals, be converted into language, and thus conveyed to thousands."

We regard this effect of travelling exercise, in unhinging and unfitting the mind for the vigorous exercise of its higher faculties, as in

* "Dr. Johnson on Indigestion."

no respect connected with its improving "all the bodily functions." It is to be explained by the simple fact, that whilst in a rapid journey, the sensations are kept vividly engaged, the mind is altogether occupied in the reception of ideas, and no time is permitted for the exertion of the 'higher faculties.' But every one who has dwelt in a romantic region will admit that a residence in such a situation adapts the mind for loftier flights of the intellect, than one which furnishes no food for contemplation, or for mental elevation. All this, however, is independent of any corporeal effect of travelling.

On his road to Italy, Dr. Johnson passed through the Valais, and through its capital, Sion. This gives occasion to some observations on *goître* and *cretinism*—those singular affections dependent upon locality, but upon what peculiar combination of local causes we know no more than we do of the causes productive of endemic disease in general. On these the author gives us no information, but he presents a lamentable picture of the moral and physical abjection of the inhabitants of the Valais generally, and of Sion in particular.

"I explored this town," he remarks, "with great attention, traversing its streets in every direction; and I can safely aver that, in no part of the world, not even excepting the Jew's quarter in Rome, or the polluted back lanes of Itri and Fondi, in the kingdom of Naples, have I seen such intense filth! With the exception of two or three streets, the others present nothing on their surface but a nameless mass of vegeto-animal corruption, which, in all well-regulated towns, is consigned to pits, or carried away by scavengers. The alleys are narrow; and the houses are constructed as if they were designed for the dungeons of malefactors, rather than the abodes of men at liberty."

The remarks on the causes of cretinism and goître are possessed of little or no novelty. It seems that in the Valais, and in the lower gorges or ravines that open on its sides, both cretinism and goître exist in the most intense degrees, that as we ascend the neighbouring mountains cretinism disappears, and goître only is observed—and that when a certain altitude is attained both maladies vanish, and the inhabitant of the Alpine regions exhibits the characters of the resident of the most salubrious districts.

The author doubts the assertion of travellers, that cretinism is on the decrease.

"The diminution," he observes, "is, I fear, more apparent than real. The 'march of intellect,' and the intercourse with strangers have taught the parents and friends of these wretched creatures to doubt that the cretin is the favourite of Heaven, as is thought of idiots in Turkey. They therefore conceal, rather than expose, their offspring so afflicted. I saw them driving them in from the back streets of Sion on my approach. It is probable, however, that there is a diminution in the number of cretins in the Valais. Many of the auxiliary causes

are on the decline. The people are becoming more sober, more industrious, more cleanly. Those who can afford the expense, also, send their children up into the mountains to check the tendency to cretinism."

In journeying through the Milanese, Dr. Johnson had an opportunity of witnessing that peculiar affection, which has sprung up in the Lombardo-Venetian plains within the last one hundred years, and appears to be rapidly on the increase, so that, at this time, according to our author, a sixth or a seventh of the population is affected in those parts of the country where it is most prevalent. We allude to the loathsome *Pellagra*, which is thus described by him.

"It begins by an erysipelatous eruption on the skin, which breaks out in the spring, continues till the autumn, and disappears in the winter—chiefly affecting those parts of the surface which are habitually exposed to the sun or the air. This cutaneous symbol of an internal disorder is accompanied or preceded by remarkable debility, lassitude, melancholy, moroseness—hypochondriacism—and not seldom a strong propensity to suicide. Year rolls on after year, and the cutaneous eruption, as well as the general disorders, become more and more aggravated, with shorter and shorter intervals in the winter. At length the surface ceases to clear itself, and becomes permanently enveloped in a thick, livid, leprous crust, somewhat resembling the dried and black skin of a fish! By this time, the vital powers are reduced to a very low ebb—and not seldom the intellectual functions. The miserable victim of this dreadful pellagra loses the use of his limbs, more particularly of the inferior extremities—is tormented with violent colic, head-ache, nausea, flatulence and heartburn—the appetite being sometimes null, at others voracious. The countenance becomes sombre and melancholy, or totally void of expression—the breath fetid—the teeth rotten—the inside of the mouth ulcerated—the mucous membrane highly irritable, and diarrhœa is a common accompaniment of the other disastrous train of miseries. But the most distressing phenomenon of all is a sense of burning heat in the head and along the spine, from whence it radiates to various other parts of the body, but more especially to the palms of the hands and soles of the feet—tormenting the wretched victim day and night, and depriving him completely of sleep! He frequently feels as if an electric spark darted from the brain, and flew to the eyeballs, the ears, and the nostrils, burning and consuming those parts. To these severe afflictions of the body are often added strange hallucinations of the mind. The victim of pellagra fancies that he hears the incessant noise of millstones grinding near him—of hammers resounding on anvils—of bells ringing—or the discordant cries of various animals! The disease, when advanced, takes the form of many other maladies, as tetanus, convulsions, epilepsy, dropsy, mania and marasmus—the patient ceasing at last to exist and to suffer, when reduced to the state and appearance of a mummy. It is by no means uncommon—who can say it is wonderful—that the wretched being abbreviates the term of his afflictions, and anticipates the too tardy hand of death in a paroxysm of suicidal mania! It is remarkable that this tendency to self-destruction very often assumes the form of a desire to consummate that last act of the tragedy by drowning—so much so that STRAMBI, a writer on the pellagra, has given it the name of HYDROMANIA, when this propensity exists."

The cause of this affection, according to our author—

"Is just as inscrutable as the causes of hepatitis on the coast of Coromandel, elephantiasis in Malabar, Beriberi in Ceylon, Barbadoes leg in the Antilles, goître among the Alps—the plica in Poland—cretinism in the Valais—or malaria in the Compagna di Roma;"—

Or, the author might have added, of any endemic, epidemic or contagious affection, for our ignorance is extreme regarding the causes of any and of all. Yet hypotheses, as on every occult subject, have been numerous. Pellagra has been ascribed to humidity, to defective nourishment, to insolation, to filth, and,—what seems strange to an inhabitant of this continent,—to the use of Indian corn. "Professor SPEDALIERI, of Pavia," says M. VALENTIN, in his *Voyage Médical en Italie, fait en l'anneé* 1820, "informed me that some of the inhabitants of the country a few miles from Bologna, where he was residing, having made use of corn bread, *(Pain de maïs—Zea mays,)* during a period of scarcity, were attacked with the pellagra. The affection had never been seen there before, and when the cause ceased, the effect disappeared also." It is due, however, to M. Valentin to remark, that he does not believe in this assigned cause. He must, indeed, have had numerous opportunities, when in this country, for observing that the disease does not follow the use of corn to any extent whatever. The other causes assigned are palpably insufficient to account for it, and we are compelled to do that, which is one of the most difficult accomplishments for the physician to attain—to express our total ignorance of the matter. Valentin asserts that pellagra bears no analogy to lepra, elephantiasis or herpes, and that it is not contagious. "When uncomplicated, it is cured by rest, good living, wine, bathing, and by emigrating at the onset."

On the subject of *malaria*—the 'fitful pest' which desolates the fairest portions of Italy, and which is so intensely interesting to the physician, and to the inhabitants of many districts of our own country, Dr. Johnson offers absolutely nothing, which is not familiar to most of our readers. Like every judicious writer on the subject, he expresses his unqualified ignorance of its nature and cause. He alludes to certain of its laws, which are well known, but, like most recent writers on malaria, he is disposed, we think, to refer many diseases to its agency, where the relation between cause and effect seems to us to be extremely obscure, and more than equivocal. What evidence, for example, have we, that tic douloureux is owing to any malarious emanation, as is maintained by the author in the following extract, as well as by Dr. MACCULLOCH and others? The last mentioned writer on the whole subject of malaria, appears to have

pushed his views to the most visionary extent. In an article published in the 72d number of the *Edinburgh Review*, and which was ascribed, correctly we have no doubt, to that gentleman, it was gravely asserted that "whenever it, (the miasm,) occurs in this city, (Edinburgh,) where it is now rare, the poison, we have little doubt, is transported from Holland;" in other words, that it emanated in Holland, is borne undiffused some hundreds of miles across the ocean, passes over intermediate districts, and singles out the Scotch metropolis for its devastations. Since the appearance of that strangely hypothetical essay, the same gentleman, as our readers know, has published an *ex professo* treatise on malaria and the diseases produced by it, in which he includes fever, apoplexy, lethargy, coma, paralysis, epilepsy, hysteria, asthma, palpitation, mania, hypochondriasis, dyspepsia, nervous disorders, atrophy, hepatitis, rheumatism, dysentery, pellagra, goitre, tic douloureux, and the whole tribe of neuralgic complaints!

The opinions of Dr. Johnson on this subject are expressed in a style peculiar to the author, and exhibit his wonted effort at the grandiloquent and typical.

"From some acquaintance with the effects of malaria or vegeto-animal effluvia (?), on the human constitution, both at home and abroad, I venture to affirm that this invisible poison is a very fertile source of obscure but harassing disorders. I have already said that one of its characteristics is the slowness or insidiousness of its effects. Another, and still more characteristic feature of malarious disorders, is their alternations of activity and repose—in other words, the periodicity of their accessions and remissions. They love to prolong the life of their victim, in order that he may die a series of deaths—like the eastern tyrants, who protract the immolation of the criminal by dropping water from a height on his naked head.

"The class or tribe of malarious maladies comprehends numerous families. At the head of one of them stands the foul TERTIAN fiend, distinguished by the peculiarity of his warfare on the human race—a regular series of attacks and retreats. The sufferer is thus harassed, but held up by alternate days of sickness and health, till the TERTIAN FIEND delivers him over to two of his merciless offsprings, LIVER and DROPSY, who finish the tragedy of life. These are the victims of malaria which meet the eye in all parts of the Campagna, Maremma, Pontines, and many other insalubrious localities of fair Italy.

"At the head of another tribe of miasmal afflictions, stands one of the most terrible enemies of human nature. Unlike the TERTIAN FIEND, he gives no warning of his approach, no clue to the probable periods of his attack. The invisible and poison-pointed dagger is plunged, without notice, into those parts of our organization where sensibility is most acute, and, consequently, where pain is most agonizing! The stroke is repeated without remorse, and without the merciful humanity of quickly destroying its victim, who is reserved for

years of torture and long protracted despair! Need I say that this destroying angel is Tic Douloureux. It is a product of malaria; but fortunately, in this its highest grade, it is not a very common malady. The inferior branches of this family, however, are exceedingly numerous, even in our own country, comprehending all the forms of chronic rheumatism, sciatica, face-ache, clavus hystericus, and the whole of the neuralgiæ, or wandering and periodical pains, dolorous sensations, &c. for which names have not yet been invented.

"The offspring of malaria and certain morbific agencies conjoined, as intemperance, moral afflictions, and other ills of life, would require volumes for their elucidation. As malarious exhalations act strongly and injuriously on the digestive organs and the nervous system, the range of their influence is wide beyond all calculation. One general character, however, appertains to all the disorders connected with a malarious origin—PERIODICITY, or remissions and exasperations. Whenever this phenomenon, (periodicity,) shows itself, malaria should be suspected; and those countries or localities which are infested by this destructive agent should be avoided. The misfortune is, that both in England and Italy, the poison is often introduced into the constitution, in doses so minute, that no immediate effect is produced, especially while the excitement of novelty, and the exhilaration of travelling last. When these are over, the penalty of *residence* in malarious countries will, sooner or later, be paid; though, even then, by sufferings, which are rarely traced or attributed to their real origin. Their nature being mistaken, the treatment is ineffectual; and health is sacrificed! But, as I shall have occasion to touch on this subject again, when speaking of the medicinal effects of an Italian climate, I shall bring this section to a close."

The difficulty of tracing effects to their causes is proverbially great; but nothing can be more obscure than the relation between the diseases and the cause assigned in this extract. The fallacy of the author's views doubtless consists in regarding all diseases, that are of a periodical character, as caused by malaria, because intermittent fever is. The experience of our own country, fertile in many of its districts in malaria, and that often of a most virulent kind, will not sanction the assertion, that tic douloureux is of malarious origin, or that all diseases, characterized by periodicity, should lead to the suspicion of malarious influence. It is difficult to attain exact statistical information on such subjects, but we are satisfied of the accuracy of our statement, when we affirm that tic douloureux and many of the affections enumerated by Dr. Macculloch, and apparently assented to by Dr. Johnson, cannot be regarded as malarious in the ordinary acceptation of the term. We should have regarded it as an equally plausible hypothesis, had they referred some of the functions of the frame that are executed periodically in health, to malarious influence. The rage for generalization, which prevails at the present day in medicine, as it does in some of the collateral sciences, has occasionally led to much erroneous speculation and deduction.

The picture which the author draws of the miserable physical and moral condition of the inhabitants of the Campagna di Roma, and of those other districts, where the malaria emanates in fatal abundance and virulence, is melancholy in the extreme. Some idea may be formed of the extent of malarious influence from the statement given by Valentin of the quantity of cinchona annually consumed in Rome and its environs. According to an estimate obtained by that gentleman from the *Dogana*, or Custom-house, not less than 10,200 pounds, (12 ounces to the pound,) are annually imported; the consumption of which is as follows:—

At the hospital of the Holy Ghost	4,000
At that of Saint John	2,000
In other hospitals	500
In the *Pharmacies* of the town	200
In the neighbouring towns	3,500
	10,200

a quantity which appears almost incredible!

The second portion of the work, which, by the by, is characterized throughout by the most exclusive Anglican feeling, furnishes no other topic particularly deserving of comment. We pass on, therefore, to the third part—on "the influence, (moral, physical and medicinal,) of an Italian climate and residence in sickness and in health"—the most interesting portion of the work to the physician. We do not intend to follow the author in his *ultra* views of the "moral influence," which, we regret to see, exhibit undue and unworthy prejudice against the manners and religion of the people. Our remarks will be restricted to the two last "influences."

The climate of Italy is now better understood than it was formerly. The tours of the different travellers, and the excellent work of Dr. James Clark, have satisfactorily shown, that it is one of great vicissitudes, and but little adapted for the invalid, particularly for such as may be labouring under pulmonary disease. But let us hear what Dr. Johnson says on this subject.

"Italy, indeed, is very singularly situated in respect to climate. With its feet resting againt the snow-clad Alps, and its head stretching towards the burning shore of Africa, it is alternately exposed to the suffocation of the sirocco, from the arid sands of Lybia, and the icy chill of the tramontane from the Alps or the Apennines. The elevated ridge of mountains, that bisects the whole of Italy longitudinally, operates powerfully in modifying her climate.

"Against the summits of this rugged and lofty chain of Apennines the sea-breeze that has swept the Mediterranean, or even the Atlantic Ocean, on one

side, or the Adriatic on the other, strikes often with great violence; but is, on the whole, impeded in its course—more especially the lower strata of air—hence the stillness of the atmosphere so remarkable at Rome and many other parts of the western plains and valleys of Italy. This stillness is by no means advantageous, in point of salubrity, to a country where deleterious exhalations are hourly issuing from the soil in the summer season, and which are dissipated by winds and concentrated by calms. Thus, then, this Apennine ridge affords no protection from the chilling blast of the Alps, or the enervating sirocco of Africa; while it diminishes the utility, by obstructing the current of sea-breezes, from whatever point they may blow. But the Apennines themselves, when they annually resume their caps of snow, become the source of most piercing and cutting winds, more chilling than those from the Alps, on account of their greater proximity to the plains. The Apennine, therefore, is one of the agents which produce those excessive transitions of temperature, to which the atmosphere of Italy is subjected.

"The belt of ground, or series of plains and valleys, on the western side of the Apennines, is very differently circumstanced from that on the eastern. The lime-stone stratum, on the Adriatic side, is prodigiously thick; and prevents the issue of subterranean fires, in the form of volcanos. The stratum covering the primitive rock, on the western side of the Apennines, is infinitely less dense. No vestiges of volcanos have ever been found on the Adriatic declivities—while the western slope, on which all the great cities are built, presents craters in abundance. The geology of the Roman environs, and of Italy generally, shows, *first*, the operation of some tremendous subterranean fire that hove up the Apennines themselves;—*secondly*, the operation of the sea on all the grounds lower than the Apennine ridges;—*thirdly*, the operation of fire again, in heaving up and disrupting the marine depositions;—*lastly*, the operation of stagnant *fresh waters*, as evinced by the various depositions from that source. In Rome and its immediate neighbourhood, the operation of the last three causes has been clearly traced by Leopold, Von Buch, and others.

"From the relative situation, then, of the Alps, the Apennines, and the sands of Africa, it may be said that almost every breeze in Italy comes over a volcano or an iceberg—and, consequently, we are alternately scorched by the one and frozen by the other.

"There is a vast difference between the *variability* of climate in England and in Italy. In England the changes, (barometrical, thermometrical, and hygrometrical,) are very *frequent*, but they are also very *limited in their range*. In Italy it is just the reverse—the transitions are *not* very frequent; but, when they do occur, the range is often most extensive. Now the *frequency* of alternations in England, and the moderate range of these alternations, are the very circumstances which render them comparatively innocuous. We have cloud and sunshine, heat and cold, winds and calms, drought and rain, twenty times in one day at home; but the British constitution becomes inured to them, and safely so, from the rapidity of their recurrence and the limitation of their range. Nay, this perpetual scene of atmospheric vicissitudes not only steels us against their effects, but proves an unceasing stimulus to activity of body and mind, and, consequently, to vigour of constitution."

Yet this is the country to which so many hundred invalids have been, and are annually sent, far from their homes and their comforts, with the delusive hope of *escaping* the winter. Nothing, indeed, can be more injurious to the valetudinarian, with delicate lungs, or who has a tendency to pulmonary affection, than the excessive and sudden vicissitudes to which southern France and Italy are so signally liable. "The more I see of Italy," observes Mr. MATTHEWS, in his interesting '*Diary of an Invalid*,' who, himself, laboured under a pulmonary affection, "the more I doubt whether it be worth while for an invalid to encounter the fatigues of so long a journey, for the sake of any advantages to be found in it, in respect of climate during the winter. To come to Italy with the hope of *escaping* the winter, is a grievous mistake. This might be done by getting into the southern hemisphere, but in Europe it is impossible; and I believe that Devonshire, after all, may be the best place for an invalid during that season. If the thermometer be not so low here, the temperature is more variable, and the winds are more bitter and cutting. In Devonshire, too, all the comforts of the country are directed against cold;—here, all the precautions are on the other way. The streets are built to exclude, as much as possible, the rays of the sun, and are now, (Rome, December 20th,) as damp and cold as rain or frost can make them. And then, what a difference between the warm carpet, the snug elbowed chair, and the blazing coal fire of an English winter evening; and the stone staircases, marble floors, and starving casements of an Italian house! where every thing is designed to guard against the heat of summer; which occupies as large a portion of the Italian year, as the winter season does of our own. The only advantage of Italy then is, that your pennance is shorter than it would be in England; for I repeat that, during the time it lasts, winter is more severely felt here, than at Sidmouth, *where I would even recommend an Italian invalid* to repair, from November till February; if he could possess himself of FORTUNATUS's cap, to remove the difficulties of the journey. Having provided myself with a warm cloak, which is absolutely necessary, for the temperature varies twenty degrees between one street and another, I have been proceeding leisurely through the wonders of Rome."

In all these situations, too, to which invalids are sent, pulmonary affections, especially inflammation of the chest, are very prevalent, and, in many of them, the deaths from pulmonary consumption are as numerous as in Great Britain, and other countries from which the consumptive are hurried for the purpose of enjoying a more favourable

climate. Dr. Clark affirms, that in the whole of Italy, inflammation of the lungs appeared to him more violent and more rapid in its course than in England; and Dr. Kreysig, of Dresden, informed him that he had never witnessed such violent cases of pneumonic inflammation in Germany, as he saw during his stay at Pavia. The testimony, indeed, of every medical traveller is hostile to the expectation of relief in pulmonary disorders, when at all advanced, from a residence under the beautiful skies, but uncertain climate of southern France and Italy.

In our own country, it becomes a matter of momentous inquiry, to select the situations best adapted during the cooler months, for those who have a tendency to, or are labouring under, pulmonary affections. In the summer season, the climate of most parts of the United States is sufficiently mild, with ordinary precautions; but the intense vicissitudes of the autumnal, winter and spring seasons, render it advisable that the invalid at those times should seek a more genial residence.

The following table deduced from the meteorological registers, kept by the Surgeons of the U. S. Army, may aid us somewhat in this investigation.

PLACES.	Mean temperature.	Difference between mean temperature of warmest and coldest month.	Mean temperature from October to March.	Mean monthly variation in the winter months.
	Degrees.	Degrees.	Degrees.	Degrees.
Fort Brady, Michigan	41.37	50.22	24.94	46.50
Fort Sullivan, Maine	42.44	42.61	29.77	39.33
Fort Wolcott, Rhode Island	51.02	39.32	38.57	32.5
Council Bluff, Miss.	50.82	48.73	34.61	61.83
Fort Columbus, New York Harbour	53.78	55.00	38.14	38.00
Fort Mifflin, Philadelphia	53.42	44.28	40.32	39.66
Washington, District of Columbia	56.56	44.47	40.49	36.00
Fort Johnson, Smithville, N. C.	58.88	32.24	56.58	30.16
Fort Moultrie, Charleston	60.18	33.38	56.21	37.50
Cantonment Jessup, 25 miles from Natchetoches			60.47	42.66
Cantonment Clinch, near Pensacola	68.77	29.75	59.36	39.66
St. Augustine, Florida	72.23	27.34	65.55	26.66
Cantonment Brooke, Tampa Bay, Florida	72.37	22.02	66.41	

So far as this table goes, the climates of St. Augustine and of Tampa Bay, Florida, would seem to be best adapted for the consumptive. They are liable, however, to much humidity, and are conse-

quently disagreeable to many valetudinarians. In the interior of the country, such objections probably do not exist: but inland districts are liable to greater vicissitudes, as a general principle, than those near the sea-coast; whilst insular situations are more equable than the latter, owing to the air having to pass over an expanse of water of nearly the same temperature throughout before it reaches them, whatever may be the quarter whence it proceeds. The mean temperature of Funchal, Madeira, is 68°.54; the difference between the mean temperature of the warmest and coldest month is only 11°.52; and the mean temperature of the winter months 63°. The range is twice as great at the Havannah, but the temperature is more elevated. The mean throughout the year is 78°.08. At Vera Cruz the mean is 77°.72; and the difference between the mean temperature of the warmest and coldest month 10°.80; whilst at Cumana the annual mean is 81°.86; and the difference between that of the warmest and coldest months only 5°.22. These last situations are consequently, so far as regards elevation, and equability of temperature, extremely favourable to the consumptive, but they are obnoxious to weighty objections owing to their general insalubrity. The mean temperature of the winter months at Jamaica is 74°.5.

Now, it is well known, that phthisis pulmonalis is not a disease of the torrid regions of the globe, although it is occasionally seen there. A climate, therefore, which approximates that of the torrid zone, will be best adapted for those of weak lungs; yet we occasionally witness phthisical patients even in the confirmed state of the disease, thoughtlessly sent by an inconsiderate physician, in the height of summer from the warm regions on the Atlantic side of the Alleghanies to the comparatively cool and uncertain climate of the Virginia springs; a residence at some of which, especially at the white sulphur, in Green Briar County, is well calculated to develop the affection in such as are by no means strongly predisposed to it, and is consequently with all its discomforts a most insalubrious retreat for the consumptive.

It is now fully admitted, that if they are to derive advantage from a removal to a more genial sky, it must be before the disease becomes confirmed. After this, it is the height of thoughtlessness, if not of cruelty, to send them from their *homes*, devoid of all these comforts which the word comprises, to die far from their friends and connexions. The following observations of Dr. Johnson, on the advantages and evils of an Italian climate are judicious and universally apposite.

"When health is assailed, and life menaced in tender youth, the solicitude of parents is ever ready to make any sacrifice for warding off the danger;—and it is at this critical period, that a remedial or preventive measure, difficult in its execution, hazardous in its result, and too often erroneous in its principle, is put into operation on a slender foundation of hope, and perhaps on a doubtful accuracy of discrimination.

"Fortunately for the sufferings of British invalids, the question respecting a foreign climate in PULMONARY CONSUMPTION has lately been narrowed very much—since it is now universally acknowledged that, when the disease actually exists, viz. where tubercles of the lungs, (constituting the essential cause of the malady,) have softened down, and begun to appear in the form of purulent expectoration, a southern climate is not only useless, but injurious. The advocates of Italy or the South of France, now limit the utility of those climates to a somewhat undefinable state of the human constitution, termed—"disposition towards consumption"—"tubercular cachexy"—in short, to *delicate health*, without any tangible disease. This cachectic habit has been characterized by pallor of the complexion, subject to sudden changes—pearly-whiteness of the eyes—languor of the countenance—dryness of the skin, or alternate dryness and moisture—quickness of the pulse—various derangements of the digestive organs—and a readiness to be put out of breath on taking exercise. In cases like these, I have little doubt that a journey to Italy, or a winter's residence there, would be often beneficial to the general health; but there are very few who would think of going to a foreign climate, solely for the purpose of correcting a delicacy of health corresponding with the foregoing statement.

"But when, to this condition of health, are superadded cough, pain in the chest, shortness of breath in exercise, and feverish symptoms, the important question then comes to be agitated—are there, or are there not TUBERCLES in the lungs? It is often extremely difficult to solve this question, after the most careful examination of the symptoms and the most accurate investigation by the stethoscope—notwithstanding the confidence with which some medical men determine the point.

"Supposing, however, that we have strong reason to calculate on the existence of tubercles, (which, unfortunately, is but too often the case,) how are we to ascertain the *progress* which they have made, between the size of millet-seeds and that of nutmegs—between induration and fluidity? These bodies may be perfectly inert in themselves, though of considerable magnitude and in great numbers, producing little other inconvenience than that of merely diminishing the capacity of the lungs for air by their presence: or they may be softening down, and on the very point of bursting forth into the air-tubes, and thus exhibiting the fearful criterion of confirmed consumption—still without any alarming symptoms. The difficulty, then, of ascertaining the *advance* which these tubercles may have made, and the degree of inertness or activity in which they exist, is extremely great—and yet it is unquestionably upon an accurate discrimination of this point, that the propriety or impropriety of emigrating to a southern climate hinges. Without any other than the symptoms of general delicacy of health, before alluded to, or the superadded ones of a dry cough, &c. the tubercles may be so ripe and so softened down, that before the invalid passes

the Alps or the Apennines, they may burst forth, and then the discovery is made, when too late, that the patient is in a worse climate for PULMONARY CONSUMPTION than the one which has been abandoned at so great a sacrifice! This is an every-day occurrence; and the chance of such an event is a fearful drawback on the benefits of a warm climate in affections of the chest.

"But, granting that the pulmonary tubercles are in a quiescent state, (in which state we know they very often remain during a long life, and with little inconvenience,) do we run no risk of their being excited into activity by those excessive atmospheric transitions which occur in Italy? I have endeavoured to show, that the longer the intervals between these vicissitudes, and the greater their range when they take place, the more dangerous they are, and the more likely to kindle up inflammation in the chest, and thus accelerate the march of the tubercular affection. To these drawbacks, we are to add the discomforts and inconveniences of Italian houses, which are all calculated to shade us from heat rather than protect us from cold—the ardent suns of summer being a still greater nuisance than the chilling winds of winter."

And he concludes with the following remarks:—

"The sum total of our knowledge, then, on this important point, appears to stand thus:—I. In DELICATE HEALTH, without any proof of organic changes in the lungs—in what is called a "tendency to pulmonary affection," a journey to Italy, and a winter's residence there, (under strict caution,) offer probabilities of an amelioration of health:—II. In cases where there is a suspicion or certainty of tubercles in the lungs, not softened down or attended with purulent expectoration, an Italian climate, *may* do some good, and *may* do much harm—the chances being pretty nearly balanced:—III. Where tuberculous matter appears in the expectoration, and where the stethoscope indicates that a considerable portion of the lungs is unfitted for respiration, a southern climate is more likely to accelerate than retard the fatal event—and takes away the few chances that remain of final recovery.

"If this be a correct estimate, (it is at least an honest one,) of the influence of an Italian climate on constitutions disposed to, or affected by PULMONARY CONSUMPTION, it shows that medical men incur a fearful responsibility in proposing to the parents and friends of invalids a measure which is fraught with danger, involved in uncertainty, and too often attended by the most destructive sacrifices of the feelings as well as the finances of the parties concerned!

"Those who have not witnessed lingering illness and death-bed scenes in distant climes, can form no just conception of the tide of mournful emotions which daily rushes over the mind of the dying stranger in a foreign land. Death is deprived of more than half his terrors by the sympathy of friends, and the consciousness that our ashes shall be deposited in the land that gave us birth, near those whom, in life, we cherished, loved, or revered! This may be a prejudice—perhaps even a weakness; yet it is NATURAL—it is instinctive—and the instincts of Nature can seldom be entirely repulsed, even by the most philosophic minds.

'Expellas *naturam* furca tamen usque recurrit.'

"But the sigh of sorrow, perhaps of regret, is not always buried in the grave of the sufferer, on these occasions. The COMPANION, who counts the tedious hours of protracted disease, and closes the eyes of the departed friend in a foreign country, undergoes a terrible ordeal, always harassing to the feelings, and not seldom hazardous to life;—while the surviving relatives, at home, are subject to the painful anxiety of suspense—sometimes to the poignant stings of remorse, for having suffered the victim of an irremediable malady to expire on a foreign shore!"

The author properly observes, however, that there is a large class of complaints, which resemble consumption—as chronic inflammation or irritation of the mucous membrane of the lungs, which, under due care, are benefited by passing the winter in the milder localities of Italy. He thinks it probable, too, that in some cases, where there is a very partial or circumscribed tuberculation of the lungs—the rest of the apparatus being unaffected—a winter's residence in Rome, Pisa or Nice might be advantageous. "This is the opinion at least of Dr. Clark; but here the greatest care is to be taken, in examination with the stethoscope, to ascertain that the expectoration comes from a very small excavation, the lungs being elsewhere in a sound state;"—a point, by the way, not always easy of execution. R.

BIBLIOGRAPHICAL NOTICES.

IX. *Traité de la Réunion Immédiate—et de son Influence sur les Progrès Récens de la Chirurgie dans toutes les Opérations, Ouvrage dans lequel on compare les Principes suivis dans les diverses Ecoles, et les Résultats obtenu dans les grandes Hôpitaux de France.* Par M. SERRE, Professeur agrégé à la Faculté de Montpellier, ex-Chirurgien Chef interne à l'Hopital Saint-Eloi, de la même ville, ex-Chef de Clinique Chirurgicale, &c. 8vo. Paris, 1830.

Treatise on Union by the First Intention, and its Influence on the recent Progress of Surgery, &c. By M. SERRE.

This work was first conceived by M. Serre, in consequence of the supposed injustice shown to French surgeons in general, and to those of Montpellier and the provinces in particular, by Professor Richerand in his recent History of the Progress of Surgery. But as others were speedily found to enter the lists in defence of the national reputation, our author enlarged his plan; and has presented to the world a solid octavo of five hundred and seventy-one pages, in defence of those principles of surgery which are generally considered peculiarly English—showing that there has never been wanting men of great distinction and learning to support those principles in France and other parts of the continent of Europe.

It would be difficult to find another work of a controversial character, and called into existence by the rivalry of contending schools, in which candour and the absence of rancour are more clearly displayed.

The work commences with a chapter upon the history of union by the first intention, more particularly in its application to amputations and other great operations. Of course, this chapter adds but little to the information contained in the writings of Kurt Sprengel, and Samuel Cooper, under the head of amputation, except what relates to the local history and present state of this mode of treatment in France.

Soon after the publication of Alanson's celebrated treatise, Desault in 1783 amputated the thigh of a female, and endeavoured to heal the wound by the first intention. The stump was completely cicatrized on the twenty-second day.

"From that moment, this method extended itself through France; young surgeons hastened to England and Scotland to witness its effects in practice, and in a short time it was publicly taught by some professors." p. 25.

The revolution put a check to the advance of the doctrine by cutting off the intercourse with foreign countries—but it was not entirely forgotten. After the affair of Newbourgh, Percy performed ninety-two amputations upon the field; but six of his patients died, and in twenty-six days the remaining eighty-six patients were cured, and able to appear in person to receive the reward accorded to them, from the hand of General Dessoles. Many surgeons, captivated by this brilliant success, copied the example of Percy; but among the vast

number necessary for the supply of the armies of France, it can hardly be surprising that the youth or inexperience of some unfitted them for that delicate manipulation necessary to the most perfect success of the method, or that they occasionally lacked professional knowledge.

"The voice of the chiefs," says M. Serre, "could not always make itself audible, and the principles of immediate reünion were sometimes misunderstood or forgotten."

The works of John Hunter and the treatise on wounds by John Bell, had scarcely invited renewed attention to this subject, when the author of the well known Clinique Chirurgicale, threatened total destruction to its reputation in France, but the flood of facts constantly accumulated by the army surgeons, among whom the method of immediate union was always more generally popular than with the civil practitioners, proved too strong to be overthrown even by Pelletan. The labours of Professor Dubois also contributed to strengthen the hands of its advocates, and to supply numerous proselytes to the doctrine. In 1812, M. Maunoir, the elder, presented to the National Institute a memoir in which he combated the opinions of Pelletan with high success, and occasioned thereby considerable excitement in the profession.

But it is to the unfortunate Delpech, one of the immediate preceptors of M. Serre, that the latter concedes the credit of carrying the practice of uniting wounds by the first intention, beyond any of his cotemporaries and compatriots, thus changing the entire face of surgery in the school of Montpellier. One of his most brilliant triumphs was the check which he succeeded in opposing to the ravages of an epidemic hospital fever, and gangrene at l'Hopital Saint-Eloi, which carried off nearly all the wounded admitted into that institution from the army of Spain, whose cases required considerable operations. This success was due to the care with which he sought to effect immediate cicatrization, to accomplish which, he cut off the ligatures close to the knot, and finding the adhesive strips insufficient to produce the desired effect, he freely employed the suture in closing the integuments. Treate in this manner the greater part of the patients recovered.

Indeed one of the most remarkable features in the surgery of Montpellier, is the free employment of the suture, and perhaps in this country the prejudice against this mode of treatment may be carried somewhat too far. We have almost never employed them ourselves, even in wounds of the nose, ear, and eyelids, but it must be confessed that in extensive incisions and lacerations much more skill is required to accomplish the accurate coäptation of the edges by means of adhesive strips alone, than by the aid of the suture. The irritation produced by the suture, when properly used, is very slight, the deformity almost imperceptible, and in hospital practice, at times when there exists an epidemic tendency to erysipelatous affections, we have occasionally seen considerable inconvenience resulting from the action of the adhesive plaster on the skin. Fortunately for us the hospital gangrene is a disease scarcely known in America, or this inconvenience might have been much enhanced.

The progress of the practice of union by the first intention seems to have been rather slower in the capital than in the provinces. M. Serre remarks, that while the question was considered nearly settled in the latter in 1814, M. Roux presented a memoir to the Institute, complaining of its unfavourable re-

ception in Paris, and giving twelve cases of its application to the circular amputation of the thigh. The surgeon of La Charité is fearful however of effecting too accurate a coäptation of the edges—he proposes leaving a gap at the inferior angle. In this respect he does not differ materially in principle, from the highest American surgical authority, for Dr. Physick does not advise the healing of the integuments of a stump by the first intention, lest small abscesses should be formed and do injury within.* But what is much more astonishing, Roux does not advocate the immediate union in amputations of the forearm and leg, and Serre himself saw him dress with lint two stumps after amputation of the thigh, so recently as 1829! "which proves that his ideas upon this subject are not yet definitively settled." (p. 34.)

Among the authorities who are considered as wavering on this question, M. Serre enumerates Richerand, acknowledging at the same time that he is one among those who have most strongly insisted upon the utility of this mode of treatment in France, but he is taxed with claiming more credit for originality than is his just desert, and also with some inconsistency in dates, on which we make no further comment than to state that this is the only passage in which M. Serre seems to have indulged in any thing resembling severity: no mean praise in our esteem to the author of a controversial work.

Boyer in the last volume of his Traité des Maladies Chirurgicales, strongly opposes the plan of union by the first intention in amputations, stating that it is seldom successful, and that the stump is sometimes longer in healing under this treatment than when plugged with lint.

We have given this outline of such parts of M. Serre's historical researches as relate to the progress of the doctrine of immediate union in France, in order to show that although there exists some foundation for the charge so often urged in England and reëchoed in this country, that in the treatment of wounds, French surgery is in the rear of the age; yet there have never been wanting able and justly celebrated advocates for the, so styled, English method. The censure is much less generally applicable than is supposed, and we think that M. Serre has successfully vindicated the character of the school of Montpellier, if not that of the nation at large.

The question discussed in the work before us, is so completely settled on this side the Atlantic, that it will hardly be expected of us to draw very largely upon its contents in this notice, but there are occasional remarks which demand a moment's attention.

The second chapter, under the head of Considérations Générales, contains the author's physiological and pathological opinions. Without expressing a positive opinion upon the position of Hunter as to the vitalization of blood, he does not consider the presence of a certain amount of either blood or pus between the divided parts as a material embarrassment in the cure of stumps by the first intention, as both are frequently absorbed—he therefore strongly recommends the accurate coäptation of the integuments by means of suture, although he grants that more or less suppuration takes place in almost every instance, occasionally causing some corrugation of the cicatrix. Although we

* Gibson's Surgery, Vol. II. p. 402.

agree with him as to the propriety of effecting a union of the deeper seated parts, and the integuments also as speedily as possible, we cannot perceive the necessity for the use of the suture in the treatment of amputated limbs, except perhaps during the prevalence of such an epidemic as that which prevailed at Montpellier, to which we have alluded above, and in cases where the integuments display a strong tendency to roll inward, producing a deep groove at the line of junction, as frequently happens in œdematous members.

Union by the first intention is justly considered by M. Serre as a very light labour for the system. He says that the existence of grave constitutional diseases, such as scrofula, herpes, syphilis, &c. do not materially embarrass the process, and he adduces several very strong cases in support of his opinion. That the presence of either of these diseases renders the chance of success in accomplishing immediate union somewhat less considerable we dare not pretend to deny, but it is hardly necessary to contend for the propriety of making the attempt in every case, in an article intended for American readers—although we have recently heard very much to our surprise, that several respectable practitioners in this country advocate an opposite course, upon the same principles which govern some of the distinguished surgeons in France. They hold that the elaboration of pus has a tendency to eliminate the disease! Now even were this idea correct, which it is far from our design to acknowledge, we have at our command, issues and setons, by means of which the same end can be accomplished in a manner infinitely more philosophical and free from all the dangers of exfoliation, gangrene, hæmorrhage, and a vast unmanageable sore.

M. Serre denies the possibility of union by inosculation, believing that a new product is invariably formed between the divided surfaces. The new intermediate structure, in primary union is highly extensible, and this property enables the surgeon to effect the removal of deformities otherwise totally incurable. M. Delpech, for instance, divided the tendo-Achilles in a child who had a congenital contraction of the gastrocnemii, and by careful and continued flexion of the foot, succeeded in enabling the patient to walk. But the suppurating membrane, (membrane pnogenique of Delpech,) first noticed by Bichat, which constitutes the bond of secondary union, is possessed of an indefinite power of contraction, and becomes ultimately fibrous—hence, those deformities which result from secondary union with loss of substance, he holds incurable. The worst cases of this nature are seen in burns; but sufficient benefit has resulted from the excision of the cicatrices formed after such injuries to prove beyond dispute, that they are not entirely without surgical remedy. It should be borne in mind, however, that by the removal of cicatrices we necessarily increase, in some degree, the original loss of substance, and that the disposition to contraction continues in full force after the operation. It is only where we can destroy many firm adhesions with deep-seated parts, and by availing ourselves of the extensibility of the surrounding sound integuments, to cover the site of those adhesions, succeed in substituting the primary for the secondary bond of union, that any benefit will result from our exertions. The degree of relief will be commensurate with the extent to which this substitution is carried, and must depend in great degree upon the laxity of the connexion between the integuments and the parts beneath. The neglect of these considerations has

caused the failure of some attempts at the removal of eschars in this country, and has prevented most surgeons from undertaking such operations even under the most favourable circumstances.

In the third chapter, M. Serre considers the conditions necessary to the success of immediate union. He points out certain causes of the want of success which has prejudiced some of his compatriots against the plan. As there is little which would be new to an American reader under this head, we shall merely notice, one or two points upon which we are compelled to differ in opinion from the author. He dwells, we think, too strongly upon the propriety of enucleating tumours in preference to removing them by regular dissection carried through the surrounding parts, when he advises this plan of removal for cancers. The French it is true use the term cancer in a somewhat more extended sense than most of our own surgeons—and it may be that tumours so styled occur, which are sufficiently isolated to admit of this mode of extirpation. But while we remember that we are men and

> "———— drew milk
> As sweet as charity from human breasts,"

we cannot regard the preservation of the mammary gland as a matter of very serious consequence in a question of life and death.

It would be exceedingly improper to remove the whole mamma in every case of incipient cancer, but those which we have examined, and they are many, have never been sufficiently free from adhesion to the neighbouring parts, to warrant a dependence upon simple enucleation for a radical cure.

Our author dwells with great stress upon the dangers resulting from the enclosure of other parts than the arteries in tying ligatures—an error but too prevalent in this country. He advocates the occasional utility of the method of tortion proposed and practised by Amussat, and since adopted by Velpeau, Roux and others—and he insists very strongly on the advantage of tying the smallest arteries, even those that require a considerable time for their discovery. This direction should be received, we think, with considerable caution. Two distinguished surgeons of this city carry this principle very far, but the majority of operations performed in the Pennsylvania Hospital from 1817 to 1827, were completed with the employment of very few ligatures; and secondary hæmorrhage is of rare occurrence in Philadelphia. Those species of bleeding which result from hæmorrhagic idiosyncrasy, or from the exhaustion of the system by typhoid disease and excessive discharges, take place from vessels altogether too minute to be detected. The only effectual preventive for these accidents is the speedy accomplishment of union. Now the repeated contact of the sponge, and the continued exposure rendered necessary by a protracted search after small vessels, tends to diminish very much the probability of immediate union, and may produce the very evil against which the surgeon is contending. We mean not to argue against a proper degree of caution, but we believe that it is sometimes carried too far. We have seen the forearm successfully amputated, with the employment of but too ligatures, the thigh with three, and in the extirpation of a cancerous disease of the mamma, axilla, and intermediate glands, the tumour of the first mentioned gland dipping beneath the great pectoral muscle and adhering to two of the ribs, after an incision of eleven inches in extent we

applied but four ligatures. These are unusual cases it is true, but they have an important bearing on the question.

The rest of this chapter is occupied in discussing the objections raised by Pibrac against the use of sutures, and in determining the relative merits of the adhesive strips, uniting and compressing bandages in effecting the coäptation of divided surfaces; and in the concluding section, the author speaks of the medical treatment of patients after wounds and operations. From this section we learn that Professor Delpech recommends the exhibition of an opiate after every painful operation, upon the same principle with that so frequently advocated in the clinical remarks of Dr. Parrish.

"In general," says he, "the death of the patient is certain after an operation which exceeds half an hour in duration, unless we relieve the pain immediately upon its completion." (p. 139.)

The fourth and fifth chapters are devoted to a fair and candid statement of the principal objections urged by various authorities against the plan of immediate union, with suitable replies, and to a comparison of the success of this and the opposite mode of treatment; from which we rise with the conviction that the author has most ably defended his cause, and aided materially in elevating the just reputation of the school of Montpellier. His references to the plans of treatment pursued at the different hospitals of Paris, and their comparative success, are highly interesting. We quote but one fact because it has some relation to a question that does not seem to be absolutely settled even in this country. It appears that at the Hôtel-Dieu, and l'Hopital Saint-Louis, more importance is attached to the union by the first intention than at the other hospitals; and it is at these institutions that there occur the smallest number of deaths after the excision of the mamma. M. Serre witnessed a greater amount of mortality from this operation at La Charité in one year, than had taken place in ten years at l'Hôtel-Dieu de Montpellier! Lest it should be supposed that this circumstance resulted from the greater number of patients admitted at La Charité, he adds "if it were necessary to establish here a rule of proportion, the difference would be still more striking." (p. 173.)

The remainder of the work consists of applications of the general principles laid down in the preceding chapters to the whole range of surgical operations. It is replete with interesting cases and explanatory remarks; commentaries on the peculiar modes of different surgeons, and the practice of the various hospitals of Paris. It is evidently intended more particularly for the profession in France, and cannot fail to produce considerable effect in the sphere for which it is designed. It is written in a spirit of perfect fairness, and whether the peculiar views of the author bring him into collision with the professors of a rival school, or as sometimes happens with his own favourite preceptor, the love of truth evidently rises superior to personal considerations.

The American reader will find little to object against, except perhaps the constant employment of sutures and some peculiar ideas on the subject of cancer. While the multitude of important facts and cases which the work contains, will amply repay the labour of perusing nearly six hundred pages written in defence of opinions which he feels no disposition to oppose. R. C.

X. *On the Law of the Diffusion of Gases.* By THOMAS GRAHAM, Esq. M. A., F. R. S. Ed. &c. [Trans. Royal Soc. Edin. Vol. XII. Part I. 1832.]

One of the most interesting subjects which has occupied the attention of philosophers within the last few years, has been the development of the laws which regulate the diffusion of gases through each other. The bearing of the subject upon general science and upon physiology, has led to the study of it under two different aspects; it is considered in the former point of view by Mr. Graham, in the memoir of which the title is prefixed to this notice. We propose to notice this memoir somewhat in detail, not with the intention of giving a historical view of the entire subject, or of any part of it, but to compare it directly with a memoir "on the penetrativeness of fluids," which appeared two years since in this Journal, by J. K. Mitchell, M. D. Lecturer on Chemistry in the Philadelphia Medical Institute. The paper of Dr. Mitchell was published in November, 1830, and his experiments were made in July, August, and September of the same year; the memoir of Mr. Graham was read before the Royal Society of Edinburgh on the 19th of December, 1831, or one year subsequent to the publication, in this Journal, of the experiments of Dr. Mitchell.

Not only this; the entire memoir of Dr. Mitchell was copied into the Journal of the Royal Institution of London, part of it having appeared in the number published in July, 1831, and part in that of November of the same year. The paper of Mr. Graham was, therefore, read more than four months after the publication, in England, of the first part of the memoir of Dr. Mitchell. Others less charitable might charge at once a similarity of experimental results, occurring under such circumstances, to more than mere accident; but we are not disposed to deal thus, being rather contented to show where the similarity exists, and to claim for our countryman his due meed of praise for successful experiment. In such an award Mr. Graham should be the first to join us, and we are satisfied that he will do so, and thus our charity will be proved not misplaced.

The memoir of Mr. Graham begins by stating the law of diffusion in the following terms:—

"The diffusion, or spontaneous intermixture of two gases in contact, is effected by an interchange in position of indefinitely minute volumes of the gases, which volumes are not necessarily of equal magnitude, being, in the case of each gas, inversely proportional to the square root of the density of the gas."

This leads us to remark upon the entirely different objects to which Dr. Mitchell and Mr. Graham directed their attention, a difference which renders the analogy of their experiments the more striking. The former experimented upon the *power* with which the diffusion was accomplished, and the *rate* for different gases; the latter upon a *total effect*, namely, the amount of one gas exchanged for another when the whole diffusion was terminated. If Mr. Graham shall be thought to have fully established the law which he lays down, he is solely, as far as we know, entitled to the merit of it; we consider it a great merit, and if we require further evidence to prove satisfactorily so important a proposition, it results in part from the want of success of his methods when ap-

plied to gases varying most in their physical characters from those, upon the results obtained with which the law may be deemed to rest. A further reason will be stated in the course of our comments. We proceed to the task of comparison, in this case not an ungrateful one, since, we repeat it, our object is not to disparage Mr. Graham, but to claim for our countryman the priority in an ingenious series of observations. After stating his law, and the definition of his terms, Mr. Graham proceeds—

"If the two gases are separated at the outset by a screen having apertures of insensible magnitude, the interchange of 'equivalent volumes of diffusion' takes place through these apertures, being effected by a force of the highest intensity; and if the gases are of unequal density, there is a consequent accumulation on the side of the heavy gas, and a loss on the side of the light gas. In the case of air, for instance, on the one side of the screen, and hydrogen gas on the other, a process of exchanging one measure of air for 3.7947 measures of hydrogen through the apertures is commenced, and continues till the gases on both sides of the screen are in a state of uniform mixture. Experiments on this principle can be made with ease and precision, as will appear in the sequel, and afford an elegant demonstration of the law." pp. 222, 223.

Dr. Mitchell says—

"I confined it," (the gas,) "in a wide-mouthed bottle, over the aperture of which I tied very firmly a thin sheet of the elastic membrane," (prepared gum elastic.) "In a few hours the descent of the cover into the cavity of the bottle gave evidence of a diminution of the contained gas, and finally the cover was burst inwards by the pressure of the atmosphere, so great had been the rarefaction of that which remained in the bottle." "The minuteness of the atom of hydrogen might readily enough account for the greater facility with which it penetrated the membrane, but could not be considered a good reason for the *energy* with which the penetration was accomplished." "The *power* was ascertained by comparison with common air, and the *rate of action* both in that mode and by comparison with each other."

The instrument used by Mr. Graham in his experiments, and which he called a diffusion tube, is thus described:—

"A simple instrument, which I shall call a diffusion tube, was constructed as follows:—A glass tube open at both ends was selected, half an inch in diameter, and from six to fourteen inches in length. A cylinder of wood, somewhat less in diameter, was introduced into the tube, so as to occupy the whole of it, with the exception of about one-fifth of an inch at one extremity, which space was filled with a paste of Paris plaster of the usual consistence for casts. In the course of a few minutes the plaster set, and withdrawing the wooden cylinder, the tube formed a receiver closed with an immoveable plug of stucco." p. 226.

"I shall treat in succession of the escape of the different gases from a diffusion instrument into air. As the contained gas bears no proportion in quantity to the external air, the gas escapes entirely, and is wholly replaced by air. It is of the utmost importance to determine the proportion between the volumes of gas diffused, and the replacing volume of air eventually found in the instrument. We thus obtained the *equivalent diffusion* volume of the gas, which it will be convenient to state in numbers with reference to the replacing volume of air as unity." pp. 228, 229.

The instrument employed by Dr. Mitchell is thus described:—

"Having constructed a siphon of glass with one limb three inches long, and the other ten or twelve inches, the open end of the short leg was enlarged and

formed into the shape of a funnel, over which, finally, was firmly tied a piece of thin gum elastic. By inverting this siphon, and pouring into its longer limb some clean mercury, a portion of air was shut up in the short leg, and was in communication with the membrane. Over this end, in the mercurial trough, was placed the vessel containing the gas to be tried, and its velocity of penetration measured by the time occupied in elevating to a given degree the mercurial column in the other limb."

By the use of plaster, various difficulties were encountered by Mr. Graham, owing to the absorption and retention of the gases by the plaster, &c. which were avoided by the simple covering used in the diffusion tube of Dr. Mitchell. Both the experimenters assume that the phenomena of diffusion or penetrativeness are the same with and without the interposition of a membrane, or other capillary mass. Upon this point we are by no means certain, and it seems to constitute an objection to the conclusiveness of the law investigated by Mr. Graham, as being that of the *diffusion of gases*. That the total diffusion in different gases does not follow the order of their absorption and retention by charcoal and other porous bodies, &c. is no refutation of our objection. On this subject Dr. Mitchell remarks—

"If the recipient beyond the membrane be as active as the membrane, or more so, all that the membrane brings to its surface will be transmitted as fast as it arrives; but if that recipient be of inferior penetrability, less will pass on than the membrane could carry through, and in that case the rate of penetrativeness of the substance is inappreciable. Any gas penetrates another gas better than it does any solid, hence we obtain for *them* the true rate," &c.

It is possible that the modifying effect of the membrane, or of the stucco, may disappear in the case of gases, but we cannot understand that it should necessarily do so, and in establishing an important law, no point should be left uninvestigated, which may influence the general result.

The necessity of examining the effect of mechanical pressure seems to have occurred to both experimenters. Mr. Graham says—

"I was led to investigate the rate at which air, hydrogen, and the other gases flow through the stucco plug into a vacuum under the influence of mechanical pressure.

"A small bell jar, with an opening at top, was used, which opening was closed with a plug of Paris plaster of half an inch in thickness, over which a brass cap and stop-cock were fitted and cemented. This receiver was placed on the plate of an air-pump, in perfect order, and exhausted. When the stop-cock of the receiver was closed, nothing entered the exhausted receiver; but on opening it, either air entered, forcing its way through the pores of the stucco, or any gas which might be conducted to it by means of a flexible tube from a proper magazine." p. 237.

Dr. Mitchell remarks—

"The circumstances essential to the transmission of gases through the membrane, formed an interesting subject of inquiry.

"My first attempt was to produce a vacuum, by placing the gas in a bottle, and exhausting by means of an air-pump the bell glass which covered it. The gases effected their escape from the bottles thus treated, with a velocity proportional to the rate of permeation already ascertained; sulphuretted hydrogen passed out more rapidly than carbonic acid, and that than hydrogen. Still as *some* air is always found in an exhausted receiver on the finest air-pump, I passed a tube containing carbonic acid into a Torricellian vacuum, where it very speedily escaped, and caused the descent of the mercury, &c."

Again, Mr. Graham observes, on the effect of *increased* pressure—

"The greater the pressure, the more rapidly are gases forced through the pores of the plug; but the quantity of gas which penetrates in any given time is not exactly proportional to the pressure, at least in the case of air and hydrogen. By doubling the pressure, we do not quite so much as double the quantity of gas forced through." p. 238.

"The ratio of the times in hydrogen and air is not greatly different at different pressures." p. 239.

The different materials through which the diffusion was effected, are next to be noticed. Mr. Graham states—

"Dried bladder answers for showing the diffusion of hydrogen when stretched over the open end of a tube receiver. The diffusion, however, through a single thickness of bladder, is effected at least twenty times more slowly than through a thickness of one inch of stucco. While, on the other hand, either air or hydrogen, under mechanical pressure, passes more readily through bladder than a great thickness of stucco. Gold-beater's skin is even more permeable by gases under a slight pressure than bladder, and less suitable for diffusion." p. 240.

On the subject of the *same* materials, we find from Dr. Mitchell—

"Accordingly, each gas was subjected to the action of animal membranes, which replaced the gum elastic at the mouth of the shut limb of an inverted siphon. Dried bladder, and gold-beater's skin, moistened to cause an approach to a normal state, and sections of various recent tissues, were successively tried, and found to act on the gases in the manner and order in which they were affected by gum elastic. The more *recent* the membrane, the more rapid and extensive the effect produced; and in living animals the transmission was very rapid."

Besides these substances, Mr. Graham experimented upon stucco, cork, certain minerals, charcoal, and wood. Dr. Mitchell upon caoutchouc, various animal membranes, &c.

We should here remark, that the observation of the inflation of a bladder, partly filled with coal gas and plunged in a receiver of carbonic acid, made by Mr. Graham, and published in the Journal of the Royal Institution, 1829, is noticed in extenso by Dr. Mitchell, while the same experiment, though bearing so immediately upon the subject, is not even alluded to in Mr. Graham's own paper.

Both the experimenters criticise the theory of Dalton of the diffusion of gases. Mr. Graham remarks—

"It might occur, in explanation of our experiments with the diffusion instrument, to take Mr. Dalton's hypothesis; and suppose, in the case of hydrogen, the external air to be a vacuum to the hydrogen, and the hydrogen to be a vacuum to the air, and that the *inequality* of the diffusion depends upon the hydrogen *being least resisted in passing through the plug*. The experiments on the permeability of the stucco by gases under pressure, above detailed, were projected with a view to settle this point among others; and they are evidently incompatible with such an application of the theory, for hydrogen passes 2.4 times more swiftly, and not 3.8 as in the diffusion experiments, &c."

Dr. Mitchell—

"The power of the penetrativeness is very considerable, being *certainly* su-

perior to that of two, and *possibly* equal to more than that of forty atmospheres."

"We are struck with an unexpected result, the *great* POWER of gases to infiltrate *each other*. It has been long known, that aëriform substances confined in the same apartment, finally mingle uniformly, and that, even if the lighter one be placed above the other. To account for this, and some other facts of the same class, Mr. Dalton supposed that each gas, in reference to the vertical relation of its particles, stood in an attitude of independence of any other gas present, as much as if no such gas were confined along with it, no particle of one gas being supposed to rest on any particle of the other, the interstitial cavities of one gas being in fact a *vacuum* for the reception of the molecules of the other, each for each.

"The *power*, however, of this infiltration being known, we are entitled to conclude, that the interspaces of gases are reciprocally occupied with a force similar, and probably equal to that which causes the imbibition of liquids by solids, and produces solutions of substances, even of the highest cohesive attraction."

We conclude by a recapitulation of the points proved by Dr. Mitchell, and to which he has a just title of priority over any claims which Mr. Graham's experiments would give.

"1st. Substances, formed of organic matter, are generally penetrable by gases of all kinds, and by several, if not by all liquids.

"2d. Each animal or vegetable tissue is differently penetrable as to time by different fluids.

"3d. But all fluids penetrate any particular substance at rates susceptible of being ascertained. The gases retain the relation observed by reference to one substance in all other cases. Whatever may be the greater or less penetrability of any given tissue, the gases penetrate it, relatively to each other, according to the ratio observed in experiments on other tissues.

"4th. The *ratio* is not so uniform in the substance of denser fluids. Liquids, though rateable with regard to permeation of any given substances, do not act similarly on different organic substances. Thus water penetrates most, if not all animal tissues, better than any other liquid whatever, and consequently passes through them to accumulate in *any of its own solutions*, and in alcohol or ether; while these two latter substances penetrate gum elastic with more facility than either water or its solutions. Therefore with regard to gases, the *ratio* of penetration depends on them alone, while in the case of liquids, it depends on the joint agency of both liquids and tissues.

"5th. When the quantity of the fluids is limited, there is a gradually diminished rate of progression as the infiltration proceeds. It is proportional to the state of dilution, and ceases when the substances have become on both sides of the membrane, of uniform condition, unless some extrinsic power is then operative.

"6th. The power of the penetrativeness is very considerable, being certainly superior to that of two, and *possibly* equal to more than that of forty atmospheres.

"7th. Penetrativeness acts not only on organic tissues, but also on gases and liquids, and with apparently equal power on all. For after permeating a membrane, the gas or liquid goes on into the molecular tissue of the gas or liquid beyond, and no pressure which the membrane can bear, acts as a restraint on the progression.

"8th. Although of such high mechanical power, the penetration can be to a certain degree, affected by extrinsic agency. Thus pressure or attraction will cause permeation, where it would not otherwise take place, as when a single gas or liquid travels not only through, but beyond a membrane, where there exists nothing to imbibe it, which it would not do, unless subjected to propulsion. Electricity, possessed of hydrogogue powers, acts on water in a similar

manner, causing it to collect on either side of an animal membrane, at pleasure, although no other liquid is there to receive it.

"9th. The penetrativeness of gases for each other seems to vary in velocity, but not in force.

"10th. Reference to the above-mentioned law and modifying agencies enables us to explain many phenomena hitherto imperfectly understood. We, by means of them, comprehend the uniform constitution of mixed gases in any vessel, or in the atmosphere, notwithstanding the greatest difference in specific gravity. It explains the diffusion of odours, the nature and progression of caloric under slow conduction. It affords us new views of the theory of respiration, and accounts, in that process for some well ascertained facts, for which there previously existed no adequate explanation.

"It shows us how emphysema and tympanitis may happen without secretion of gases, or lesion of tissue, and how a spontaneous cure may be produced. It leads to the probability of the existence of gaseous matter of very various kinds, in almost every part of the animal frame, resident there molecularly, and not *en masse*, but susceptible of being collected into mass in the great cavities or the cells of the tissue, or blood-vessels by mechanical or electrical influence, or the attractive interstitial agency of other masses of air.

"It teaches the important truth, that water is the great general infiltrator and diluent, a knowledge of whose habitudes will be thus rendered more clear and more useful." B.

XI. *Caspar Hauser. An account of an Individual kept in a Dungeon, separated from all Communication with the World from early Childhood to about the Age of Seventeen* Drawn up from Legal Documents. By Anselm von Feuerbach, President of one of the Bavarian Courts of Appeal. Translated from the German. Boston. Allen & Ticknor. 1832, pp. 178. 12mo.

Many of our readers doubtless recollect to have seen, in the papers of the day, an account of an individual who it was represented, had been found in Nuremberg in a condition which left his previous life enveloped in the greatest mystery. This individual is the subject of the present short, but extraordinary narrative, which may be truly termed a romance of real life. To the physiologist and metaphysician it is a most invaluable record, as shedding a new and most unforeseen light on some of the most intricate questions connected with the development of the human mind.

We shall not attempt to follow the history of this unfortunate being, except as connected with circumstances which fairly come within the design of a medical work. All that may be necessary to state at present is, that when Hauser was found, he appeared to be about sixteen or seventeen years of age, had never learned to speak, and that in all probability he had been shut out during his whole life from all communication with the world, in a narrow, dark dungeon, in which he was always obliged to remain in a sitting posture, that his food had invariably been bread and water; in fact, that he had enjoyed a mere animal existence.

"Light had never shown upon this being, either on his eye or on his soul; and when he emerged from his lonesome darkness, he was like a new-born child in respect to all which must be acquired by experience, whilst the instruments for acquiring that experience, the natural faculties, of course differed from those of a child so far as they were affected by the mere age or growth of the individual."

His physical appearance when he appeared at Nuremberg is thus detailed. He was four feet nine inches in height, and about sixteen to seventeen years old. His chin and lips were very thinly covered with down; the dentes sapientiæ were wanting. His skin was fine and very fair; his limbs were delicate, and his feet showed no marks of having ever been confined by a shoe. His face was almost without expression, except that of a brutish obtuseness. He scarcely knew how to use his hands or fingers. His gait was like the first attempts of an infant to walk.

A medical examination was ordered to be made, the results of which, as stated by Dr. Osterhausen in his report, present some curious anatomical details. The patella, instead of forming a prominence, lay in a hollow. The tendons of the two vasti muscles were separately inserted into the tibia. From this peculiar formation, when Hauser sat down, with his leg and thigh extended horizontally on the floor, his body formed a right angle with the thigh, and the knee-joint was applied so closely to the floor as to prevent the passage of even a card beneath it.

He constantly evinced the strongest aversion to all kinds of meat and drink, and would only partake of bread and water. Even the smell of other food affected him disagreeably. The ingestion of the smallest quantity of wine, or coffee, occasioned him cold sweats and vomiting; even milk disordered his stomach. He was in possession of but two words, which he used to designate living beings; whatever appeared in the human form he called "bua," and to every animal he gave the name of "ross," (horse.) When first found, not only his mind, but most of his senses were in a state of torpor, but his nervous excitability was soon developed in an extraordinary degree; thus, the beating of a double drum near him threw him into convulsions. Not a spark of any religious belief was to be discerned in him.

The account which he gave of himself was as follows:—

"He neither knows who he is nor where his home is. It was at Nuremberg that he first learnt that besides himself and 'the man with whom he had always been,' there existed other men and creatures. As long as he can recollect, he had always lived in a hole, (a small, low apartment, which he sometimes called a cage,) where he had always sat on the ground with bare feet, and clothed only with a shirt and pair of breeches. In his apartment he never heard a sound, whether produced by man, by an animal, or by any thing else. He never saw the heavens, nor did there ever appear a brightening (daylight) as at Nuremberg. Whenever he awoke from sleep he found a loaf of bread and a pitcher of water by him. Sometimes this water had a bad taste; whenever this was the case he could no longer keep his eyes open, but was compelled to fall asleep; and when afterwards he awoke, he found he had a clean shirt on, and that his nails had been cut. He never saw the face of the man who brought him his meat and drink. How long he continued to live in this situation he knew not."

It appears from his imperfect narrative, that his keeper once came behind him, so as not to be seen, and guided his hand so as to make it write something, and soon afterwards placed him on his feet, and attempted to teach him to walk, and finally, that the man carried him out from his prison on his back; of his journey Hauser knew but little, except that he fainted several times during it.

The state of his mind during his confinement, as far as could be ascertained, must have "been that of a human being immersed in his infancy in a profound

sleep, in which he was not conscious even of a dream." In this condition he remained till he suddenly awoke, as it were, by the forcible impressions of external objects on his senses. He has no recollection of having ridden on his journey, though, from the deep sleep which riding always produces on him, this may have taken place. When he is asleep, noises appear to have no influence on him, and even rough treatment does not awaken him.

When first found, his saliva was as viscous as glue, but this afterwards became natural, on a change of food. He betrayed a great aversion to any glare of light, and his eyes were much inflamed. He was subject to spasmodic contractions on the left side of his body, especially when excited by any new object, or when his mind was deeply engaged, these spasms were succeeded by a state of nervous rigidity. With regard to colours, Hauser always preferred the most glaring. At first he had no idea of size or distance; thus when directed to look out of a window, he instantly drew back with repugnance, this he afterwards explained, by saying that it appeared as if the objects were close to his eyes. Drawings or paintings appeared to him as much relieved as if carved in wood.

It appears from a subsequent report of his medical attendant, that the multifarious impressions made upon his mind were too powerful, and produced a high state of nervous excitability.

"The muscles of his face were affected with frequent spasms. His hands trembled so much, that he was scarcely able to hold any thing. His eyes were inflamed, they could not bear the light. His hearing was so very sensible, that all loud speaking caused him violent pain."

He lost his appetite, and his gastric functions became disordered.

He was then removed to a quiet house, and no one permitted to see him. Here he, for the first time, slept in a bed, and began to dream. One of the most difficult undertakings was to accustom him to the use of ordinary food; this was a work of months, and it is a curious fact, that before he became accustomed to warm food, he was tormented with a constant thirst, drinking daily from ten to twelve quarts of water. After he became habituated to meat, his mental activity was diminished, his eyes lost their brilliancy and expression, and in short, his state of morbid excitement gradually disappeared. This change of diet had also a remarkable effect on the development of his body, as he gained two inches in height in a very few weeks.

It would be impossible for us to detail the various mental phenomena that the gradual development of his faculties occasioned; we may, however, mention a few of the most striking, as exemplifying how slowly the mind acquires habits of just comparison. Thus, it was a long time before he could comprehend the difference between animate and inanimate objects, and he conceived that every motion which took place in any object was spontaneous; thus, if a sheet was blown down by the wind, he thought that it had run away. He supposed that a tree manifested its life by moving its branches and leaves, and that the rustling of the latter, when agitated by the wind, was the voice of the vegetable. To animals, he for a long time ascribed the same as to men, and appeared to distinguish the one from the other only by the difference of their external form.

As to his sight, it was very peculiar, as he could see in the dark as perfectly as in the light; this was proved by numerous experiments; thus, in a perfectly

dark night, he could distinguish blue from green, &c. His sight was also extremely acute, both as to distance and nicety. His hearing was as remarkable; but of all his senses, that which was the most troublesome to him, and which rendered his life miserable, was that of smell. What to all other persons was entirely senseless, was not so to him. The odour of a rose overcame him; in fact, every smell except those of bread, fennel, anise and caraway, were more or less disagreeable to him. He could distinguish fruit trees from each other at a considerable distance by the smell of their leaves. The odour of old cheese made him feel unwell, and caused vomiting. What are considered by most persons as unpleasant smells, were much less offensive to him than what we consider as agreeable perfumes.

There is a fact connected with this acuteness of smell, which settles the question of the emanations from burying grounds; when he walked near a church yard, the smell from it which was not perceptible to any one else, occasioned him a complete paroxysm of fever.

One of the most extraordinary peculiarities of Hauser's temperament was his susceptibility to magnetic and metallic excitements. A toy was given him furnished with a magnet, this he would not use, as he complained it occasioned him unpleasant sensations. On learning this fact Professor Daumer made some experiments on him with a magnet. When the north pole was presented to him, he complained of pain in his stomach, and that a current of air appeared to flow from him towards the magnet; the south pole had less effect on him. These experiments were varied as much as possible, but he was never deceived. In respect to his sensibility of the presence of metals, and his ability to distinguish them by his feelings, many instances are adduced. He described his sensations of the contact of metals, as a feeling of drawing or attraction, which passed over him, accompanied at the same time with a chill, which ascended according as the objects were different, more or less up the arm. This sensibility he gradually lost. When he caught a cat by the tail, he was seized with a strong fit of shivering, and felt as if he had received a blow upon the hand.

His present state is thus described.

"His mode of life is that which is common to most men. With the exception of pork, he eats all kinds of meat, if not seasoned with hot spices. His favourite condiments still are caraway, fennel and coriander. His drink continues to be water, and only in the morning he takes a cup of unspiced chocolate instead of it. All fermented liquors, beer and wine, as also tea and coffee, are still an abomination to him; and, if a few drops of them were forced upon him, they would infalliably make him sick.

"The extraordinary, almost preternatural elevation of his senses, has also been diminished, and has almost sunk to the common level. He is indeed still able to see in the dark; so that, in respect to him, there exists no real night, but only twilight; but he is no longer able to read in the dark nor to recognise the most minute objects in the dark at a great distance; whereas he was formerly able to see much better and more distinctly in a dark night than by daylight, the contrary is now the case. Like other men, he is now able to bear, and he loves the light of the sun, which no longer distresses his eyes. Of the gigantic powers of his memory and other astonishing qualities not a trace remains. He no longer retains any thing that is extraordinary, except his wonderful fate, and the gentleness of his disposition."

In the above abstract we feel that we have not given as connected a view

of the operations of Hauser's feelings and mental faculties as they were gradually acted on, and developed by the action of external objects, as could have been wished, this however our limits prevented, and we must therefore refer such of our readers as wish for more information, to the work itself, which will amply repay an attentive perusal. R. E. G.

XII. *An Essay on the Structure and Functions of the Skin; with Observations on the Agency of Atmospheric Vicissitudes, through the Medium of the Skin, in the production of Affections of the Lungs, Liver, Stomach, Bowels, &c.* By William Wood, M. D. Member of the Royal College of Surgeons of London, and Physician to the Newport Dispensary. Edinburgh, 1832. Octavo. pp. 172.

The agencies exerted by and through the skin, considered in reference to the healthy and morbid conditions of the animal economy, are so important as to give to the study of the structure and functions of the external covering a strong claim to our attention. The cutaneous texture is, in fact, the link which connects our system with the external world, and through which we make the acquaintance of all physical matter. Besides its nervous relations, it exercises the important functions of perspiration and absorption, with the actions of cicatrization and the formation of inorganic coverings.

The author's inquiries relative to the extent to which the two functions of absorption and transpiration are carried on, are among the most interesting presented to us. With regard to the latter function, he details the most important experiments heretofore tried: those for example of Lavoisier and Seguin, which brought those able chemists to the conclusion, that the whole loss by the skin and lungs in the latitude of Paris, at its minimum, is nearly 9 grains, troy, per minute, and at its maximum nearly 26 grains, troy. Taking the mean of the two sums mentioned for the average quantity, we find this for the twenty-four hours to be about 54 ounces. Of the entire loss, the proportion from the pulmonary surface is estimated at one-third, whilst two-thirds pass off by the skin; that is to say, 18 ounces, troy, pass off daily by the lung, and 36 ounces by the skin.

In these experiments the naked body was introduced into an air-tight bag, made of silk varnished with elastic gum; whilst breathing was maintained through a tube, the funnel end of which was glued around his lips, the other extremity passing out of the bag, so as to prevent all communication between its interior and the mouth. The difference between the weight of the body, before it was enclosed in this apparatus, and its weight after being divested of it, showed the whole loss, in a given time, both by the skin and lungs. The difference between the weight of the body immediately after it was enveloped in the bag, and just before it was divested of it, exhibited the loss by respiration, which quantity substracted from the amount of the whole loss showed the proportion by the skin alone.

The objection made by our author to this experiment, is one in which we fully agree with him, namely, that notwithstanding its ingenuity and apparent accuracy, it is questionable whether the state of the body whilst enclosed in an air-tight bag, is sufficiently near to the ordinary circumstances of existence, to induce us to adopt the conclusion without some modification or allowance.

No experiments, he thinks, are to be relied on, as exhibiting the true extent

of the secretion by the skin, unless the absorbing power of the atmosphere is allowed to exert its full effect, as in the natural circumstances of the body.

Our author prefers the method pursued by Cruikshank and Abernethy, from its leaving the body more under the ordinary circumstances. Their plan consisted in confining the hand for an hour in an air-tight glass jar, and collecting the transpired moisture. Mr. Abernethy having weighed the fluid collected in the glass, multiplied its quantity by 38½, the number of times he supposed the surface of the hand and wrist to be contained in the whole surface; and obtained as the result 2½ lbs. in the twenty-four hours. This is upon the supposition that the whole body perspires at an equal degree.

Conceiving that greater accuracy might be given to this method, our author set about making experiments with some modifications of the plan. He pasted around the mouth of the jar one extremity of the bladder, both ends of which were cut away, and the hand being passed through the bladder into the jar, the other extremity was bound to the wrist with a ligature, not so tight however as to interfere, in any degree, with the circulation. The exact weight of the jar and bladder was before ascertained, and during the experiment cold water was applied to the outer surface of the jar, to cause the deposition of the fluid accumulated within. This last measure was, we think, of exceeding importance, since it kept down the atmosphere of vapour which would otherwise have formed, and obviated any influence this might have upon the process by interfering with evaporation.

The following exhibits a condensed view of his experiments.

Time of day.	Temperature of Apartment.	Rapidity of pulse per minute.	Fluid collected in an hour.
1st, noon	66°	84	32 grains.
2d, same	66	78	32
3d, same	66	78	26
4th,	61	84	32
5th, 9 o'clock, P. M.	62	80	26
6th, same	62	75	23
Means	63.8	79.8	28.5

These results obtained, a great difficulty next arises in estimating the proportion which the surface of the hand and wrist bears to the whole surface of the body. Abernethy reckoned it at 1 to 38½; whilst Cruikshank computed it at 1 to 60. Our author considers the last estimate as unquestionably erroneous, and that of Abernethy as not altogether just. The surface of the hand and wrist, according to Abernethy, is equal to 70 square inches, which our author thinks is near the truth, having found it to correspond both with his own measurements, and with the reports of the glove-makers. But the estimate of the superficial area of the whole body, which Mr. Abernethy makes 2700 square inches, or above 18 square feet, is considered too high, and differs from that of the best authorities, who do not make it exceed 2304 square inches, or 16 square feet. Our author is therefore disposed to think that the proportion of the hand and fingers, taken to the extremities of the bones of the arm, does not fall short of 1 to 32, which, if the above proportion of the quantity transpired per hour be adopted, gives for the whole body about 45 ounces, or nearly 4 pounds troy in the twenty-four hours.

"The quantity here stated," says our author, "is considerably above that brought out by the experiments either of Seguin or Abernethy; but as, on reviewing the experiments and calculations, I find no error, I am disposed to think it cannot be far from the truth. It is true the temperature, during these experiments, was somewhat above the mean temperature of this climate; but it cannot much exceed the medium artificial warmth to which our bodies are exposed within doors. If such then is the quantity of this secretion at this moderate temperature, and when a person is at rest, at a higher temperature, and under severe exertion, it must be very much increased, to what extent, however, it must be very difficult, if not impossible, to determine. It appears that the discharge goes on as freely in the open air, at a lower temperature, as at a higher within doors. Every one must have remarked, that a person may walk at a brisk pace, even for a considerable distance, on a warm day, without any perceptible sweating, till he enters a house and sits down. In walking along, the air in contact with the clothes being constantly changed, absorbs rapidly, compared with equally dry air changed but slowly, when in contact with a person at rest; and besides, the air within doors is usually less dry than the free air without, and more particularly than that of the open country."

That cutaneous exhalation does not proceed in an exact ratio with the temperature of the atmosphere has been demonstrated by the experiments of Edwards, who found that at 68° it was twice as great as at 32°; at 104° it was seven times greater than at 32°; and that in the extremes of moist and dry air, it proceeds respectively in the ratio of 1 to 10.

The remark of Edwards, that the cutaneous exhalation becomes less in the latter part of the day, agrees with the results of our author's experiments. Both Seguin and Edwards agree that it is increased towards the end of the process of digestion, and our author thinks there is good reason to believe that it is augmented during sleep. Indeed, Sanctorious, the father of the inquiries into cutaneous transpiration, found that the body loses weight more sensibly during night than in an equal number of hours in the day.

With regard to the quantity of moisture thrown off by the lung, our author has made some experiments of his own, previously to noticing which we will observe that Sanctorious made it amount to half a pound daily; Hales to twenty ounces; Abernethy, nine ounces; Menzies, six ounces; and Thompson as high as nineteen ounces, in the twenty-four hours. The author's detail of his experiments is as follows:—

"Having fitted a large cork into the mouth of a glass jar capable of containing about three pints, I passed two glass tubes through the cork so that I might breathe into the jar through one, while the air afterwards escaped by the other. The jar was placed in a vessel of cold water, that the expired air, being cooled, might deposit its moisture; then endeavouring to imitate natural respiration as exactly as possible, I continued, for an hour, to direct the air of each expiration into the jar. Having repeated this experiment several times, about midday, I found the averaged quantity, determined by weighing the jar, to be 117 grains. When the same experiment was repeatedly made in the evening, between 8 o'clock and midnight, the average amounted to 129 grains. If the mean of these two numbers be taken, we obtain for the twenty-four hours very nearly six ounces; which agrees with the earliest statement by Sanctorious, and with that subsequently made by Menzies. It differs also but little from the quantity of watery exhalation deducible from the experiments of Lavoisier and Seguin. For if the entire loss by the lung, in twenty-four hours, is 18 ounces, and if, according to the testimony of Allen and Pepys, 11 ounces of solid carbon are thrown off in that time, there will remain just 7 ounces, for the amount of the watery exhalation. It is worthy of remark, that this watery exhalation of the

lung is at its maximum in the evening, or just at the time when the cutaneous exhalation is at its minimum. This balance between the exhalation of the skin, and that of the lung, points out the importance of the function of the skin, both as a source of disease in the lung, and as a channel of relief when it becomes actually affected."

In the much agitated question relative to the quality of the aërial portion of the cutaneous exhalation, the author is inclined to side with those who hold that carbonic acid gas is given out by the skin, which thus contributes to the contamination of the air. He also leans to the belief that the cutaneous surface carries on the process of absorption as well as that of exhalation.

Upon the subject of the agency of the skin in the production of diseases, he furnishes much interesting information of practical application, under the heads of the general effects of cold, chief seats of diseases produced by cold applied to the surface, and influence of cold upon the various membranes and tissues. His chapter on the prevention of diseases by the regulation of the skin, and the protective measures, such as exercise, clothing, and cold and tepid bath, contains much useful instruction, which we cannot at present epitomize so as to present to our readers. G. E.

XIII. *Observations on the Healthy and Diseased Properties of the Blood.* By William Stevens, M. D. London, 1832. pp. 504, 8vo.

It is not our purpose on the present occasion to inquire into the merits of Dr. Stevens' work; this may form the subject of a future article; our object is to notice the attempt which he has made to appropriate to himself the merit of having suggested to Drs. Faust and Mitchell* their experiments on the penetrativeness of gases, the results of which have shed important light upon science and reflected great credit upon the authors. We were at first disposed to smile at Dr. Stevens' claims, and to trust for their refutation to his own statement, but as his claims have been admitted, and indeed urged with some pains in a recent work,† and repeated by the reviewer in our cotemporary, the London Medical and Physical Journal,‡ it seems proper to investigate at once their validity.

Dr. Stevens' statement is so diffuse, that it is impossible for us to transfer the whole of it to our pages. The two following paragraphs however exhibit the basis of his claims, the remainder of his exposition consists of little else than verbiage and repetitions.

"The experiments which prove the action of gases on each other, have lately excited an intense degree of interest among our professional brethren in the United States. I say lately, for it was only in the month of November, 1830, that two papers appeared there for the first time on this subject—the one is on the endosmose and exosmose of gases, said to be written by a Dr. Faust; the other is a paper on the penetrativeness of fluids, by Dr. Mitchell, Lecturer on Medical Chemistry in the Philadelphia Medical Institute. Dr. Faust's paper is dated on the 23d of August, and Dr. Mitchell's on the 18th of September, 1830. But their first experiment appears to have been made on the 21st of July; that is, a short time after I had mentioned the leading, and by far the most impor-

* See this Journal for November, 1830.

† Notes to Drs. Hodgkin and Fisher's translation of Dr. Edwards' work on the Influence of Physical Agents on Life. London, 1832.

‡ December, 1832.

tant fact of the whole, not merely to one, but to several individuals in that country." p. 96.

The following paragraph explains what this "*leading, and by far the most important fact of the whole*" is; as also the period at which it was mentioned.

"I had previously to the commencement of his experiments, stated to an intimate friend of Dr. Mitchell's the leading and important fact; namely, the powerful attraction which oxygen possesses for carbonic acid, as well as the conclusions which I had drawn from this fact, relative to the agency of oxygen in the purification of the blood, by attracting the carbonic acid through the medium of the intervening membrane. The conversation I had with this gentleman was in Philadelphia, on or about the 15th of July, 1830; and when I add, that the gentleman to whom I had mentioned this important fact was afterwards, to my certain knowledge, present with Dr. Mitchell while he was performing his experiments on this subject, the reader may then form any opinion he may think proper relative to the source of the reflected light which had induced the Philadelphia writers so suddenly to commence their experiments to ascertain whether gases could or could not attract each other, even through the medium of dense membranes." p. 98.

The fact of having mentioned to a friend* of Dr. Mitchell's on or about the 15th of July, 1830, that oxygen has a powerful attraction for carbonic acid, an assertion unsupported, as it was by a single experiment, will perhaps be considered but a slender basis upon which to claim the discovery of the reciprocal action of gases through membranes, or even upon which to rest the assertion that that communication suggested to Drs. Faust and Mitchell their experiments. Independently of the experiments of Priestley, Dobereiner and Dalton, if the reader will refer to our No. for May, 1830, he will find that nine months before the visit of Dr. Stevens to this country, Mr. Graham had published the account of his experiments;† and that *two months before* the period so accurately fixed upon by Dr. Stevens as the date of the communication of his important discovery of the attraction of oxygen for carbonic acid, that Mr. Graham's experiments had been announced in this Journal in the following manner:—

"*Reciprocal action of gases through animal membrane.*—It would appear from the following singular observation, made by Thomas Graham, Esq. Lecturer on Chemistry at Glasgow, in the course of an investigation respecting the passage of mixed gases through capillary openings, that endosmose acts upon *aëriform matter*, as it does upon bodies in the liquid state. *We feel every day more and more convinced that this property acts a most extensive and important part in the functions of the animal economy.*"‡

Whether the annunciation two months *subsequently*, that gases exercised a reciprocal action upon each other, would have had any *novelty* for us, the reader may decide. But Dr. Stevens made no such communication to us. We remember, however, that in one of the visits with which he favoured us, whilst in Philadelphia during the summer of 1830, that he mentioned a belief which he entertained, that oxygen had an *attraction* for carbonic acid, a belief, in support of which he then adduced no experiment, and which was so vaguely stated as to make no impression upon us; we certainly never repeated it to any one.

* This friend, it is stated in the notes to Dr. Edwards' work, to have been the Editor of this Journal. p. 483.

† See Quarterly Journal of Science, for October, 1829.

‡ See this Journal for May, 1830. The No. was published on the 1st of May, and these observations were, of course, written some time previously.

On his return to Philadelphia in the latter end of October of the same year, Dr. S. mentioned the experiment he had tried at Saratoga, and we then informed him of Dr. Faust's and Mitchell's experiments, an account of which had been printed, though not published. Dr. Stevens appeared at that time to have no idea of the reciprocal action exerted by all gases upon one another, but referred the results of his experiment to the *attraction* exerted by oxygen for carbonic acid. His sole idea was that the oxygen *attracted* the carbonic acid through the membrane. He even now denies that the oxygen penetrates the membrane to go to the carbonic acid, (p. 92;) and thus whilst claiming the discovery of the reciprocal action of gases upon one another through a membrane, he actually denies such a *reciprocal* action.

We must also call attention to the fact, that Dr. Faust is not a Philadelphia writer, as stated by Dr. Stevens, and it is somewhat remarkable that Dr. Stevens should overlook this fact, inasmuch as in the title to the paper, the author is given as Edwin D. Faust, M. D. of Columbia, South Carolina—and again, to the date of the paper which Dr. Stevens quotes, is prefixed, Columbia, S. C. Now, this is not altogether unimportant, inasmuch as the distance between Philadelphia and Columbia, S. C. is so great, that had a letter been written on the earliest day fixed by Dr. Stevens for his communication, it could not have reached Dr. Faust in due course of mail until some days after the date of his first experiments. We had not the pleasure, however, of any personal acquaintance with Dr. Faust, and never addressed a letter to him except relative to a paper on malaria, published in our No. for May, 1830. We have also reason to believe that Dr. Faust had no acquaintance in Philadelphia, and probably never heard of Dr. Stevens, except perhaps as having taken up the internal iliac artery.

Dr. Faust, in the introductory remarks to his experiments, has stated the circumstances which directed his attention to the reciprocal action of gases upon each other through membranes. *He* lays no *claim* to *originating* the idea. *His* statement is *modest* and *unpretending*, and bears internal evidence of truth. He observes that the various researches into the endosmose and exosmose of liquids, accounts of which had been published in this Journal,* had convinced him that the facts were destined to become useful in their application, and that he was about commencing a series of experiments, when his attention was turned to another subject by the article in our May No. relative to the experiments of Mr. Graham.† Dr. Faust then started from Mr. Graham's experiments, and those who have read his lucid and philosophical paper, and will compare it with the confused, illogical, and incorrect observations of Dr. Stevens, written even after the latter had had the advantage of perusing the memoir of the former, will have little difficulty in determining to whom merit is due for throwing light upon the subject.

It is well known here that Dr. Mitchell devised in 1829 a method of forming gum elastic into very thin sheets, or bags, which excited considerable attention, and that balloons formed of these bags and filled with hydrogen gas, were exhibited to the American Philosophical Society, at the Philadelphia Museum, at Professor Hare's and Dr. M.'s lecture room, and in fact they

* The subject of endosmose and exosmose was much dwelt upon in the Vols. of this Journal, published in 1829 and 1830.

† See Vol. VII. p. 23.

became almost a common toy. Dr. M. states that he observed that these balloons, after a period varying from an hour to two days, descended, and the cause of their descent became a subject of investigation, and led him on to his subsequent experiments. Those who will read the account of these experiments* will easily decide whether Dr. Mitchell deserves any credit for them, or whether his laurels must fade before the brilliant annunciation of the 15th of July, 1830, that oxygen has an attraction for carbonic acid. With due deference, however, we would venture to suggest, that he who first said that an apple had fallen to the ground, has an equal claim to the merit of the discovery of universal gravitation.

We will not dwell further on this subject, and regret to be compelled, by our duty to our contributors, to make this exposition. Whilst, however, we cannot award to Dr. Stevens the merit he claims, we are unwilling to charge him with intentional misrepresentation, and are happy to testify to the zeal he displayed when in this country, in the investigation of the changes produced in the blood in our autumnal fevers, in cases of poisoning by the bite of the rattlesnake, &c.

Since the above was written, we have been favoured by a friend with the late edition, (4th,) of the Elements of Chemistry by Dr. Turner of the London University. The author has taken a very correct view of the subject under consideration, and done ample justice to our contributors, as will be seen from the following extracts.

"It appears from the essays of Drs. Faust and Mitchell, that their attention was awakened to the permeability of membranes to gases, by the endosmose and exosmose of liquids described by Dutrochet, by an insulated example of a similar phenomenon in gases observed by Mr. Graham, and by some facts of a like kind noticed *long ago* by Priestley. Dr. Stevens also, as stated at page 96 of his late treatise on the blood, was aware that carbonic acid passes readily through animal membranes, when air is on the other side, applied that fact to the theory of respiration, and brought the subject under the notice of several men of science in New York, shortly before the publication of Drs. Faust and Mitchell. But the views of Dr. Stevens, though well calculated to elicit inquiry were vague and partial; and the American philosophers are entitled to the merit of advancing from the detached facts of others *to the establishment of a principle.*" p. 913.

"It would perhaps be premature to speculate on the cause of this singular property of gases, nor is it material for my present purpose to do so; but as the reader will naturally desire some explanation, the following which is nearly that of Dr. Mitchell may be given as most consistent with the known properties of matter." p. 911.

"The difficulty which formerly stood in the way of both theories of respiration, arising from the supposed impermeability of membranes by gases, has been *entirely* removed by the researches of Drs. Faust and Mitchell. It fully appears from their experiments, and *of the accuracy of their principal results, I am satisfied from personal observation, that animal membranes both in the living and dead subject,* both in and out of the body, are freely penetrable by gaseous matter." p. 910.

Had other critics possessed the acute and discriminating mind of Dr. Turner, we might, as we originally intended, have submitted the case on Dr. Stevens' statement.

* See Vol. VII. p. 36, of this Journal.

QUARTERLY PERISCOPE.

FOREIGN INTELLIGENCE.

ANATOMY.

1. *Professor Ehrenberg's discoveries relative to the Structure and Functions of the Infusoria.*—If the obscurity which involves many of the most interesting phenomena in human physiology be ever dispelled, it can only be by the lights furnished by comparative anatomy, and we therefore conceive that we cannot occupy a few pages better than in devoting them to an account of the discoveries of Professor Ehrenberg, of Berlin, relative to the structure and functions of the Infusoria. These discoveries constitute an epoch in that department of science, both from the capital discoveries already made as well as from the direction they give to future researches. The best account we have seen of these discoveries, is that by Dr. Gairdner, in the *Edinburgh New Philosophical Journal*, for Sept. 1831, and we shall make free use of it in making up the following sketch of the structure and functions of the Infusoria.

Our readers will perhaps be surprised at the mention of the structure and functions of animals, the discovery of whose mere existence has been until recently deemed the ultimum of zoological research, and regarding whom, the sum total of our knowledge has been hitherto confined to a few details on their external forms and active motions. Yet, in the midst of their transparent tissues, the German naturalist has, by a peculiarly ingenious method of observation, developed a highly complicated organization, which, with those who arrange the animal kingdom in a linear series, will remove them far from the extremity of the scale. The existence of a digestive, muscular, and generative apparatus, is established beyond doubt; and organs have been also discovered, which bear great analogy with the vascular and nervous systems.

Before entering into the detail of the organization of the Infusoria, it is proper to state briefly the method by which the organs are rendered visible. This consists in furnishing the infusoria with organic colouring matter for nutriment. Simple as this may appear, it was not until after ten years' observations, that Dr. Ehrenberg succeeded in selecting the fittest substances, and in applying them in the manner best adapted for the satisfactory exhibition of the phenomena. It was not until he used pure indigo, that these experiments succeeded in a desirable manner. Immediately on a minute particle of a highly attenuated solution of this substance being applied to a drop of water containing some of the pedunculated vorticella, (which are best adapted for the first observation,) and placed under the object glass of the microscope, the most beautiful phenomena present themselves to the eye. Currents are excited in all directions by the rapid motions of the ciliæ, which form the crown round the anterior part of the animalcule's body, and indicated by the movements of the particles of indigo in a state of very minute division in different directions, and generally all converging towards the orifice or mouth of the animal, situated, not in the

centre of the crown of ciliæ, but between the two rows of these organs which exist concentric to one another. The attention is no sooner excited by this most singular and beautiful phenomenon, when presently the body of the animal, which had been quite transparent, and bearing much resemblance in aspect to some of the marine Rhizostomæ, becomes dotted with a number of distinctly circumscribed circular spots, of a dark blue colour, exactly corresponding to that of the moving particles of indigo. In some species, particularly those which are provided with an annular contraction or neck, (such as the *Rotifer vulgaris,*) separating the head from the body, the indigo particles can be traced in a continuous line in their progress from the mouth to these internal cavities.

It is requisite in these experiments to employ colouring matter which does not chemically combine with water, but is only diffused in a state of very minute division. Indigo, carmine, and sap green, are three substances which answer very well the necessary conditions, and are easily recognised by the microscope. But whatever substance is used, we must be very particular that it contains no lead, an impurity which very frequently enters into the colours of commerce.

The microscope which Dr. Ehrenberg has used in all his investigations is one constructed by Chevalier of Paris; it possesses a power of 800. In very few cases, however, is it necessary to use this high power, and only to demonstrate the existence of an internal cavity in those species which do not exceed from 1-1500th to 1-2000th of a line in diameter, such as the *Monas termo, atomus,* and *lens,* and which almost elude the power even of so powerful an instrument. In almost all cases, a power of from 300 to 400 is sufficient; and Dr. Ehrenberg has made all his observations and drawings of the structure of the *Hydatina senta* with a power of 380.

In conformity with the great axiom of scientific observation, to measure every thing which is capable of measurement, Dr. Ehrenberg has not neglected to express in numbers the dimensions not only of the totality, but also of the integrant parts of these beings, placed as it were at the verge of organized nature. For this purpose he uses a glass micrometer, constructed by Dollond, which gives directly the ten-thousandth part of an inch, and permits of a much smaller quantity being correctly estimated, as it contains the astonishing number of 400 equal parts distinctly cut in glass within the space of half a line. By means of a micrometer screw, which has been since constructed by Pistor of Berlin, he has been enabled to measure directly 1-48000th of an inch, or 1-4000th of a line, a degree of minuteness which is never necessary in actual practice.

1. *Digestive System.*—By the use of colouring matter in the way above-mentioned, a digestive system has been demonstrated in *all* the genera of this class of animals, distinctly characterized by Müller. This fact Dr. Ehrenberg states in the following proposition: "All true infusoria, even the smallest monads, are not a homogeneous jelly, but organized animal bodies, distinctly provided with at least a mouth and internal nutritive apparatus." In none has the cuticular absorption of nutritive matter ever been observed, which had been the opinion of all previous writers upon the subject, not from any positive observations, but merely from their inability otherwise to explain the nutrition of these animals. Generations of these transparent gelatinous bodies may remain immersed for weeks in an indigo solution, without presenting any coloured points in their tissue, except the circumscribed cavities above referred to; and when in a state of activity, the minute particles of indigo and carmine are seen to hurry rapidly over the whole surface of their transparent bodies, in order to reach the mouth, generally situate at one or other of their extremities. Indeed there is no necessity of having recourse to such a supposition, when we can clearly see the prehension of colouring particles, their reception into a mouth, and conveyance from thence into an internal stomach or stomachs.

The alimentary canal presents, as in the other classes of the animal kingdom, the utmost variety in respect to form, situation and degree of complication. It is in the *Monas termo, pulvisculus,* and other larger monads, simply a round sac in the centre, and occupying the greater part of their bodies. In the genera

Enchelys, *Paramæcium*, and *Kolpoda*, it assumes the form of a long intestinal canal, traversing the greater part of the body, and at times convoluted in a spiral manner, which is furnished with a great number of cæcal appendages, or stomachs; this singular disposition, of which no other example occurs in the animal kingdom, is particularly distinct in the *Leucophrys patula*. That these blind sacs are real stomachs, and do not at all correspond to the cæca of other animals, is evident from the fact of their being filled with colouring matter immediately on its being received at the mouth, or anterior orifice of the canal. The tubes which connect these sacs to the main canal of the intestine, vary very much, both in length and in diameter, as well among the different cæca, as in the same one at different times, being usually in a state of great contraction, and at times scarcely perceptible when the cavity to which it belongs is empty, and may be supposed not to be in a state of activity. We can count from 100 to 200 of these sacs in the course of the intestine of the *Paramæcium chrysalis* and *aurelia*. When they are filled with colouring matter, the common intestinal tube is usually quite empty and transparent; this, joined to the bluish, reddish, or greenish tint which they often assume when empty, may have been the reason that these sacs were mistaken by Müller for ova, and by Schweigger for internal monads still adhering to the parent trunk. In other infusoria, as the *Rotifer vulgaris*, the alimentary canal is in the form of a slender tube, and extending nearly the whole length of the body, and terminating at its anal extremity in a dilatation or cloaca for the reception of the ova and the male seminal fluid, previous to its termination at the surface of the animal. Others of larger dimensions, as the *Eosphora najas* and *Hydatina senta*, and in general all the natural group of the *Rotatoria*, possess a single cavity of considerable size and oval form, situate in the anterior part of the body; the *Zygotrochis nudis* would seem to form an exception to the general rule of this division; for this animal, when filled with colouring matter, presents a slender, spirally convoluted intestine in the centre of the body. In this animal also, the posterior cloacal dilatation is enlarged into a considerable cavity, which can retain the colouring matter for some time previous to its being discharged by the anus.

The number of stomachs varies no less than their form. The whole tribe of the *Rotatoria*, as already observed, possess but a single cavity. In the *Monas termo*, four can be reckoned.

The number of sacs, which are so many distinct digestive cavities, although connected together by a common tube, varies from 1 and 200 down to 36 in many *Vorticellæ*. The largest number is in the *Paramæcium chrysalis*, Müll., where it amounts to 120, and yet there is ample space for still more.

The *anus* is easily distinguished from the mouth, when the animal is filled with colouring matter, by its discharge from this orifice, in large irregular coherent masses, very different in appearance from the minute state of division in which it enters by the mouth. Its position varies exceedingly; in the greater number, such as the *Hydatina senta*, *Rotifer vulgaris*, and *Eosphora najas*, it opens towards the posterior extremity of the animal; in the first of these it is on the back. In the *Kolpoda cucullus* it opens into the concave surface of the animal, close to the mouth, from which it is only separated by a tongue-shaped eminence. In some of the spirally pedunculated vorticellæ, its disposition is very singular, opening along with the mouth into a common fissure, which is not situate in the centre of the circular ranges of ciliæ which surround the anterior extremity of the body, but towards the margin, between two of these concentric circles.

The *mouth* merits the notice of the systematologist, from the very precise characters which he can draw from thence for his subordinate divisions. This organ reaches its greatest complication in the *Hydatina senta*, where it consists of an orifice opening in the centre of a globular head, and provided with a pair of serrated mandibules, each resembling somewhat the single mandibules of some of the mollusca, such as the common *Helix pomatia*, or those of the echini.

When the animal is in the act of taking its food, these mandibules are in perpetual motion, opening and shutting with great rapidity, to absorb the colouring particles brought within their reach by the currents excited by the motions of the ciliæ. This very singular organization is certainly one of the most curious phenomena visible in their whole structure, and is perhaps one of the most important, as showing so close an approximation to animals far removed from them in the zoological series. Each mandibule in the species which I examined, possessed five distinct teeth, but the number varies from two, three, as far as six. Dr. Ehrenberg has since succeeded in demonstrating their real nature, by the use of very fine foliæ of mica, (the whole animal is not more than one-eighth of a line in length,) and has come to the conclusion that they are separate, simple, hard bodies, enveloped with a fleshy covering, which are ingrained into one another like the fingers of the hands when joined.

The mouth of the other infusoria is a simple unarmed opening, surrounded more or less closely with a greater or less number of ciliæ. Its position generally determines their anterior extremity. In the genus *Paramæcium*, however, it is in the middle of the length of the animal. The *Kolpoda cucullus* possesses a sort of lip surrounding its margin.

The ciliæ play a very important part in the economy of this class of animals. They may be considered as the principal organs of taste, of touch, and of propulsion. When the animal is at rest, they are often quite imperceptible, but on the addition of a small proportion of colouring liquid to the drop of water, they become very apparent, being in a state of great activity, seeming to be the principal agents by which they excite those currents which afford so beautiful a spectacle under the field of the microscope.* In the *Monas pulvisculus*, and other larger monads, their number amount to 10 or 20, and we may from this conclude that they exist even in the smallest monad. They sometimes surround the mouth in a single row, (*Vorticella convallaria, Rotifer vulgaris,*) sometimes in a double row, (*Vorticella citrina;*) occasionally they extend in regular lines, or are irregularly dispersed over the whole surface of the body. The former disposition occurs in the *Leucophrys pyriformis* and *patula*, the latter in the *Actinophrys sol.* They occupy, in other cases, only one side of the body, (*Kolpoda cucullus.*)

An *œsophagus* can only properly be said to belong to those which, like the *Eosphora najas* and *Hydatina senta*, possess a notable contraction between the mouth and the stomach. This is especially distinct in the latter, where I have distinctly traced the passage of individual coloured globules along this narrow canal from the mouth into the intestine.

Perhaps this is the most appropriate place to notice an organ of a very obscure nature, which Dr. Ehrenberg dignifies with the name of a pancreas. It is in the form of two kidney-shaped, grayish-white, glandular-looking, transparent bodies, which are placed on each side of the upper extremity of the intestine, firmly connected to, and closely embracing it. Dr. Ehrenberg regards them as bearing a greater analogy to the pancreas than to the liver of the higher animals, from their colour, form and connexions. They must, however, be left to further inquiries.

2. *Muscular System.*—A fibrous muscular tissue being the proper agent of all voluntary contraction in the animal kingdom; we might, *a priori*, expect its existence in the class of infusoria, which are so remarkable for the rapidity and energy of their movements of propulsion and translation. In the former they can only be compared with fishes, and in the latter with insects. Contractility of tissue can never explain those active voluntary efforts by which they avoid obstacles when swimming in myriads in a single drop, convey the nutriment towards the mouth,

* One of the most favourable moments for seeing these ciliæ to advantage, particularly in those species in which they invest the whole surface of the body, is when the drop of fluid under the microscope is nearly dry, when they may be seen elongated to their utmost, in a state of great activity; or if the animal be nearly expiring, in a state of rigid erection.

and perform the act of deglutition. Previous, however, to Dr. Ehrenberg nothing like the muscular fibre had ever been attempted to be shown in these animals.

As yet, from their extreme tenuity, no distinct fibres have been detected in the second and more minute division styled by Cuvier Homogeneous Infusoria, and in the new system of Dr. Ehrenberg *Polygastrica;* although from their extremely vigorous contractions, as well as from their presence in the division of the Rotatoria, we are entitled to infer their existence. In this last, distinct fibres are perceptible in the *Eosphora najas, Rotifer vulgaris, Philodina erythrophthalma* and *Hydatina senta.*

We shall select the muscular system of the latter, the *Hydatina senta,* as a specimen, from its greater distinctness and complexity. The perfectly transparent gelatinous body of this animal, when seen through the microscope with a power of 380, appears to be traversed longitudinally by several narrow bands of fibres, perfectly transparent, and of a grayish-white colour. When the animal throws itself into its violent lateral contortions, these fibrous bands are observed to shorten, become broader and thicker, (from their slightly diminished transparency,) on the side towards which the contractions are made; and on the convex to become so extremely elongated and attenuated as to be almost, in some cases, quite imperceptible. The real muscular nature of these organs, and that they are the real agents in effecting the motions of the animal, is thus placed beyond all doubt. These muscles never lose their apparent state of tension, which they would undoubtedly do on the contractions of the animal, if their nature was of another description; and when the two extremities of the body are equally approximated to each other, none of the bands become invisible, but all increase to nearly twice their former breadth, with a corresponding diminution of their transparency.

The envelope of the body of the hydatina consists of a double transparent membrane, the two layers of which are in contact with, and scarcely distinguishable from, each other, when the animal is in a state of repose. But, upon the contractions of two or more of the muscles, the internal membrane into which they are inserted becomes separated to a greater or less distance from the external. During the whole of these phenomena the stomach, ovaries, and the whole of the viscera, are perfectly visible through the transparent muscles.

These principal muscles are four pairs, which take their origin from the opposite ends of the animal, and proceed in a radiated manner to be inserted by broad striated bands near the middle of the body, (between the fourth and fifth pair of twigs given off from what Dr. Ehrenberg calls the great dorsal vessel.) The four upper or anterior muscles rise by narrow insertions from the junction of the head with the body at the root of the rotatory organs; the four posterior or inferior, from the point of insertion of the bifid tail into the body. The extent of insertion of these muscles is much greater in the *Eosphora, Philodina* and *Rotifer,* than in the *Hydatina;* in them it reaches at least from the second to the sixth of the above-mentioned transverse twigs.

These great longitudinal muscles are distinct to the most unpractised eye, but Dr. Ehrenberg views as of a muscular character, 1. The seventeen sections of the rotatory organ in the Hydatina, which must be the principal agents in directing the motions of the ciliæ; 2. A contraction or sphincter near the extremity of the cloaca; 3. A striated organ behind the cloaca, which he considers, from its situation, as an accelerator of the seminal fluid, a *musculus ejaculatorius.* In none of these, however, except the last, can the existence of a fibrous tissue be considered as beyond a doubt; though, from their situation, it is more than probable that this is their true nature. All of these parts seem to be attached to the inner layer of the external double membrane, and to be unconnected with the subjacent viscera. It is not improbable that the tail may possess some proper muscles, as its motions are not performed laterally in common with the trunk, but by an alternate retraction and elongation.

3. *Generative System.*—The partizans of the *generatio spontanea* vel *primitiva,*

who so long stood their ground in the class of Entozoa, after being forced to relinquish this position, by the discovery of the ova of these parisitic animals, took refuge in the darkness and obscurity of the microscopic infusoria, where they were almost secure of an undisturbed possession, while there was nothing known concerning them except as a homogeneous mass of transparent jelly, endowed with a few active motions; and where their negative arguments could only be attacked by analogical reasonings.

The candid and impartial mind of Müller himself, too rigid an observer to be seduced by the allurements of theory, considered the infusory animals as furnishing an incontrovertible argument for the existence of certain living forms, which are neither of oviparous nor gemmiparous origin, but derive their existence immediately from a certain indestructible living generative energy inherent to all matter;—for this very plain reason, that he had never witnessed the secrets of their origin. Such a conclusion, though perhaps too hasty, is allowable in such an observer. When, however, we see other men of distinguished talent, such as Treviranus and Oken, take up the question, where, if it were possible, they ought to have ended, and assume at once the existence of a mysterious power inherent in organic matter of generating infusory and other molecular animalcules, which form by their aggregation all organic living forms, and into which the latter are, at the cessation of their proper vitality, again resolved; we cannot help referring them to the well-known maxim of Bacon, that "Homo naturæ minister et interpres tantum facit et intelligit quantum de natura ordine re vel mente observaverit: nec amplius scit, aut potest."

The observations of Dr. Ehrenberg have not only given an additional extension to the great principle of Harvey, *omne vivum ex ovo;* but have, by a connected train of ocular demonstration, proved the existence in this class of the whole three species of generation, the viviparous, the oviparous, and the gemmiparous, and even of the simultaneous exercise of two of these in the same individual, at different epochs of its existence. Waiving at present the corroboration which this might give to the view of infusory animals forming a parallel series to their more apparent prototypes, let us proceed to state shortly a few examples of each of these varieties.

In the interior of the *Rotifer vulgaris* we often see young animals of a diminutive size, (that of the parent varying from $\frac{1}{4}$th to $\frac{1}{3}$th of a line,) perfectly formed, and near the period of exclusion, which already possess the two red points, (eyes,) near their anterior extremity, and a distinct mouth and head. They assume various postures in the interior of the parent trunk, being at times coiled up in a spiral form, or extended to their whole length. These same fœtus, if we may so call them, Dr. Ehrenberg has seen excluded in a living state from the parent. All the individuals of the *Hydatina* are hermaphrodite, possessing the completely formed male and female organs. The female consists of an ovarium, which, when in the unimpregnated state, is an oval perfectly transparent bilobed bladder-like body, closely embracing the lower part of the intestinal tube. When in an impregnated state, it increases very much in size, being augmented by the addition of two or more oval appendages, so that the whole mass fills the greater part of the posterior half of the body of the animal. When quite ready to burst it assumes a greenish-gray colour. These rounded bodies communicate by a canal, scarcely perceptible in the unimpregnated state, broad and distinct when nearly ripe, with the cloacal dilatation formerly noticed as existing near the anal orifice of the intestine. That the ova are not internal germs, an opinion entertained by many older observers, such as Lamarck and others, is proved not only from the above-mentioned development and connexions of their containing vesicles, but also by the distinct existence of the three substances which in the ova of the Entozoa, M. Rudolphi considers as the chorion, allantois and amnion. In the centre of many ova there can be recognised a darker point, which is either the embryo, or cicatrix in which the latter is developed.

The adult Hydatina possesses, besides, two organs which Dr. Ehrenberg con-

siders as the male organs of generation, but the real nature of which is a little more doubtful than that of the preceding. They resemble very much in form the milt of fish, consisting of two elongated bodies, extending nearly the whole length of the animal, exterior to the ovaria, broader towards the head, diminishing towards the tail. They terminate, (a strong corroboration of this view of their true nature,) in a number of spirally convoluted tubes, which finally open by two separate canals immediately behind the oviduct. These spiral convolutions are enveloped by an organ of a very singular nature, the function of which is very obscure: it is oval, transparent, remarkable for its irritability and sudden changes of form; at one time swelling out into a vesicular form, at another contracting into a small glandular looking organ. Dr. Ehrenberg at one time considered it to bear some analogy to an uterus; but it is more probably connected with some office in applying the seminal fluid to the ova previous to the exclusion. This organ is wanting in the *Rotifer* and *Philodina*, where the male apparatus otherwise resembles very closely that of the Hydatina.

In the *Kolpoda cucullus*, the parent animal excludes the ova in the form of extremely minute globules, bearing much similarity to some of the species of the genus *Monas*, connected by a number of filaments interwoven together in a reticular form. In an animal 1-24th of a line in diameter, that of the ova was 1-1000th of a line. The young Kolpoda were 1-144th of a line before they were distinctly seen to excite currents, and swallow the coloured particles. In the genus *Vorticella* there seems to be a combination of the oviparous and gemmiparous generations. The single species *Convallaria*, has, from their entire ignorance of its mode of development, been subdivided into no less than six distinct genera, by different observers, according to the variety in its form at different stages of its existence. It first appears in the form of minute points, not more than 1-1000th of a line in diameter, scattered upon the peduncles of a group of adult Vorticellæ. After a time these minute points enlarge in size, and send out delicate peduncular prolongations to the larger adult roots, in which state Schrank styled them *Vorticellæ monedicæ*. When still more advanced these peduncles become coiled up in a spiral form. And when they may be considered as having reached their complete organic development, though still much inferior in size to what they afterwards attain, the usual currents may be observed in the coloured solutions in which they are immersed. The same species propagates itself by germs, on the separation of a part of its body from the parent trunk. This is performed in three different ways, each of which has been dignified with the title of a distinct form.

The first is the longitudinal division in which the animal divides itself into two nearly equal halves. A fissure first appears traversing the whole length of the body; this becomes deeper anteriorly, where two horns are now visible, each provided with a distinct set of ciliæ, and a mouth, recognisable by the two currents of colouring particles directed to the apices of the two horns. The fissure becomes deeper and deeper, till they form two distinct, perfectly formed animals, attached to the apex of a single peduncle; one of these is soon detached from the latter, when it agrees in form exactly with Lamarck's genus *Urceolaria*. When the same animal moves with the hinder part forward, it forms Schrank's genus *Ecclissa;* when the conical basis by which it was attached to the peduncle, has not quite disappeared, it forms Bory de St. Vincent's genus *Rinella;* and when a little broader and more bell-shaped, with apparently only two ciliæ, it is the genus *Kerobalanus* of the same author; when fully provided with ciliæ, without any remaining vestige of the conical appendage, it is the genus *Craterina*. This Vorticella also passes through the same phases of a *transverse* division into two equal independent animals. The third method is the true gemmiform division, as in the Hydræ and Planariæ, in which a small bud is given off from the posterior surface of the animal, which is provided with ciliæ, and when separated from the parent trunk, is still of a very diminutive size.

Such are a few of the observations on the generation of these animals, from which it will be seen that they are but in their commencement, and that much remains to the patience and labour of future observers.

4. *Vascular System?*—The existence of a digestive, a muscular, and a generative system of much complexity, and very far from what we might consider as their simplest expression, may now be viewed as an ascertained fact with regard to infusory animals. The existence of the two systems which remain for our attention, viz. the vascular and nervous, is as yet somewhat problematical. The organs on which Dr. Ehrenberg confers these appellations, are very apparent, but much doubt exists with regard to their real functions.

What has been denominated a vascular system is distinctly visible only in the *Hydatina senta*. Traces of a similar arrangement are now and then perceptible in the *Eosphora*, in particular positions of the animal, but they quite disappear when the integuments are in a state of strong tension. In the former, a series of transverse lines of a white colour, and inferior transparency to the rest of its body, succeed one another at regular intervals, from the head towards the tail. These transverse striæ might at first be taken for muscles, but they differ from these entirely in their aspect and connexions. They are nine in number, exactly parallel to, and nearly at equal distances from, each other. At first sight they seem to be complete rings encircling the whole body; but, upon a closer inspection, they are observed to diminish in breadth, and finally vanish on approaching the inferior or abdominal surface of the animal. On the contrary, they augment in diameter towards the back, where they all terminate at right angles, in a line, of an exactly similar appearance to themselves, running in a longitudinal direction from the head to the tail. This longitudinal line or vessel is nearly twice the caliber of any of its tributary transverse twigs.

It will be observed, that the disposition of this main dorsal trunk, with its collateral branches, is almost exactly that of the vascular system of the Ascidia, so beautifully demonstrated by M. Savigny, which is a strong argument for their being of the same character. No motion of an internal fluid is discernible in their interior, nor has any pulsation, analogous to a heart, been ever observed. Both these phenomena, which would decide the question as to their true nature, Corti asserted that he had observed in the *Rotatoria* and *Brachionus*, but he was deceived by the tremulous motion of the canal, leading from the mouth to the œsophagus. The same was the case with Gruithuysen, who mistook the motion of the intestine in the *Paramæcium aurelia* for that of a sap-like fluid. It is worthy of note, that these white striæ are attached to the internal, not to the external tunic of the integuments.

5. *Nervous System?**—This name is given to a series of six or seven round glandular-looking grayish bodies, which envelope the upper or dorsal part of the œsophagus of the *Hydatina*. They are closely connected together, and are distinguished from all the other viscera of the body by their darker tint. The uppermost of these bodies, (ganglia,) or that situate in the mesial plane, is much larger than the rest, and gives off, from its apex, a slender branch which proceeds upwards towards the integuments at the back of the neck a little before the second pair of vascular twigs, where it forms a slight enlargement, (ganglion;) it does not stop here, but returns back and unites again, not with the large ganglion from which it was originally given off, but in one of the adjacent smaller ones. A complete circle is thus formed, bearing some resemblance to the nervous circle, which encircles the œsophagus of the mollusca, except that in this case the whole circle is situate on the dorsal or upper side of that canal. From the point of contact of this nervous circle with the dorsal vessel, it gives off two very slender twigs forward to the anterior part of the head, where, in other forms of the Rotatoria, such as the *Rotifer vulgaris*, the two red points, (eyes,) are situate. In some, such as the *Eosphora najas*, a single large red point is situate on the back of the neck, in the exact position

* According to all our ideas of known physiological laws, the existence of active voluntary motion presupposes the necessity of an animating nervous system. Hitherto, however, no attempt had ever been made to prove its existence. But here again in these animals, excluded by their delicacy and minuteness from the ordinary means of anatomical investigation, the transparency of their tissues, as it has enabled us to discover the existence of a muscular, has no less assisted us in the more than probable discovery of its necessary appendage, a nervous tissue.

of the ganglion at the apex of the circle.* The above-mentioned large mesial œsophageal ganglion, (brain,) sends off posteriorly another branch of much larger size, backwards along the abdominal surface of the animal, which closely adheres to the internal layer of its double envelope.

That these different filaments and ganglia, to which we have given the name of nerves, are not muscles, is evident from their form, their mode of insertion into the integuments, and because in the contractions of the animal they are not shortened, but assume a serpentine form, being apparently quite passive. They are not vessels, because no pulsation nor motion of a contained fluid has been hitherto perceived through their transparent tissues. If they are not organs of an entirely unknown nature, the whole analogy of their form and position, compared with that of the nervous system in other invertebrate animals, favours the idea of this being their true nature.

We may here consider as appendages to the nervous system, those coloured points situate in the anterior part of the head of these animals, and most usually on the dorsal surface, which have been considered as eyes. As already noticed, the first discovery of these organs was made in 1816 by Nitsch, who saw in the *Cercaria viridis*, (now referred by Dr. Ehrenberg to the genus *Euglena*,) three black scaliform points. In the *Rotifer vulgaris*, their pigment is of a red colour, and they are three in number, two small ones at its anterior extremity, and a single larger one at the nucha in the situation of the apex of the above-mentioned nervous circle in the *Hydatina;* and it is very probable that the two filaments, which in the latter animal are sent forwards from this ganglion, or even the ganglion itself, subserve the purposes of vision. The number, disposition, and colour of these points is the same in the *Eosphora najas*, where the mesial eye is still larger and more distinct. In the *Philodina erythrophthalma* their colour is the same, but they are only two in number, (the most common disposition in this class,) much smaller, and situate more posteriorly. In the *Lepadella ovalis* one only is visible of considerable size in the mesial situation of the large one of the Eosphora.

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2. *Attenuation of organized matter.*—Some idea may be formed of the high degree of attenuation of which organized matter is susceptible from the following facts. By Professor Ehrenberg's measurements, the *monas termo* does not exceed 1-1500 to 1-2000 of a line in diameter; and he states that the four stomachs did not occupy half the bulk of the animal. Each stomach must therefore be about 1-6000 of a line in diameter. Some of Professor Ehrenberg's observations tend to prove that the genus *monas* and some others are only the young state of some *kolpodæ*, *paramæciæ*, &c. But supposing them to be perfectly developed animals, and that their ova bear the same relation to the size of their bodies, which those of the *kolpodæ* do, that is, 40 to 1, we must conclude the existence of young monads which have a diameter of only 1-60000 of a line, or 1-720000 of an inch. Each of these monads must possess a stomach and organs passing in dimensions the power of numbers, and certainly giving us very magnificent ideas of the grandeur of organized nature.—*Ibid.*

PHYSIOLOGY.

3. *Physiological Investigations arising from the Mechanical Effects of Atmospherical Pressure on the Animal Frame.*—The weight of the atmosphere, though not constantly the same, varying from 1-12th to 1-15th of its whole weight,† on

* The best view of the disposition and appearances of the œsophageal ganglia, is got from the dorsal side of the animal, in a line with the great dorsal vessel. The nervous collar given off from the brain, is however best seen on a lateral view.

† These variations are gradual, so that it requires some days or weeks before the weight passes from one extreme to the other.

an average amounts to fourteen and a half pounds on each square inch of surface; and to this pressure the human body in common with all other objects is subjected. The whole surface then of a middle-sized person will have to support from fifteen to twenty tons of pressure, all acting inwards and tending to compress the body into a less compass. Now the question arises, how is it that the animal frame is utterly insensible of the whole, or of any part of this enormous pressure upon it. Mr. DALTON, in a late volume, (Vol. X.) of the Manchester Memoirs, has attempted a solution of this question, and we shall lay before our readers the views he has presented.

It is pretty well known that the *specific gravity* of living men in general, is less than that of water.* Mr. Robertson, formerly librarian to the Royal Society, found that if ten men taken promiscuously, one of them was a little heavier than water, and two nearly the same weight as water; two others were only about .8 the weight of water—and the other five were of intermediate specific gravities. The average of the ten was—height, 5 ft. 6¾ ins.—weight, 146 lbs.—specific gravity, 1.891—bulk, 2.618 cubic feet. From this Mr. Dalton thinks that it may be safely inferred, that the body of a full-grown living man, when plunged over head in water, will be found to average nearly .9 of the weight of an equal bulk of water.

"It is remarkable," observes Mr. Dalton, "that all the component parts of the animal frame, as least of the human subject, are severally specifically heavier than the whole body, with the exception of air.—Bone, muscular flesh, blood, membrane, &c. are all heavier than water: animal fat is perhaps the lightest of the components, but even this is heavier specifically than the whole man upon the average.—Bone from the leg of a calf I found to be 1.24 specific gravity. The lean of beef, (raw,) I found 1.045 specific gravity.—Blood is from 1.03 to 1.05 specific gravity according to circumstances:—on the whole, the solid and liquid parts of the body, examined after life is extinct, would appear on an average to be somewhere about 5 per cent. heavier than water.

"That part of the volume of man which is exclusively occupied by air, and which may therefore be considered as adding nothing material to the weight of the body, consists of the air-tubes and air-cells of the lungs, the trachea or wind-pipe, the mouth and other appendages. It is not easy to ascertain the medium volume of air in the lungs of any individual. Messrs. Allen and Pepys found the air remaining in the lungs of a man after death somewhat exceeded 100 cubic inches. I found formerly that after a full inspiration I could blow out 200 cubic inches of air from my lungs, but was then quite exhausted. My ordinary inspirations and expirations amounted each to about 30 cubic inches.†

"Judging from the above facts and considerations I should be disposed to conclude that the medium volume of air in the lungs of a middle-sized person would not be less, but rather more than 100 cubic inches. Besides the lungs there are no other receptacles for air, I believe, in the body except the stomach and bowels, which are occasionally more or less inflated with portions of air either from the atmosphere or from other sources. If we allow 150 cubic inches for the volume of air, contained in the whole man when entirely immersed in water, it will be as fair an estimate perhaps as can be made. But it may be imagined by some that the whole substance of the body is pervious to air; that the skin, the flesh, the blood, and even the bones, may be imbued with air, somewhat in the same manner that water is, and yet have no cavities or cells in which the air is collected into a visible volume. Whether such an idea has ever been entertained or discussed I am not aware; but I presume no one has succeeded in determining either the nature or the quantity of the air so enveloped in the system. We shall now examine how far such a notion is countenanced by the preceding statement of facts.

"According to the preceding table of Robertson the average bulk of the ten

* Phil. Trans. Vol. 80.—Hutton's Dict. Sp. Gr.
† Memoirs Vol. II, (new series, p. 26.)

men was 2.618 cubic feet = 4500 cubic inches nearly; but of this volume 150 inches according to the above estimate were air, and the remainder 4350 inches were solid and liquid parts of the body. Now the average specific gravity of those parts of the body has been estimated above at 1.05 when examined as dead matter; this would make their weight equal to 4567 cubic inches of water; whereas it was found by actual weighing to be 146 lbs. as per table = 4044 cubic inches; hence the observed weight was less than the calculated weight, a portion equal to the weight of 523 cubic inches of water, or more than 1-9th of the whole weight of the body."

This discrepance demands investigation. Mr. Dalton thinks that it is not likely that Robertson's table of the specific gravities of men give too low an estimate; be this as it may, it certainly is not true as stated by him that the human subject generally floats in water *until the lungs become filled with that element.* Dr. Cullen in many dissections found no water in the lungs; and Dr. Goodwyn's experiments which are conclusive on this subject, show that only a very small quantity of water enters the lungs of drowned animals.* The specific gravities of the component parts of the body appear not to be overrated—and it will hardly be contended that the lungs of a middle-sized man will hold at a medium state of inflation six times the volume of air Mr. D. has assigned.

Upon the whole, Mr. Dalton is "inclined to believe the true explanation of the difficulty will be found in this, that the whole substance of the body is pervious to air, and that a considerable portion of it constantly exists in the body during life, subject to increase and diminution according to the pressure of the atmosphere, in the same manner as it exists in water: and further, that when life is extinct, this air in some degree escapes and renders the parts specifically heavier than when the vital functions were in a state of activity.

"The facts that water absorbs air of all kinds, that the quantity of air absorbed is proportional to the pressure and density of the gas, whether it be alone or mixed with other gases, and that certain laws of equilibrium take place, by which water acquires that state in which it is disposed neither to give out nor take in any more gas, have been abundantly proved by Dr. Henry and myself. M. Saussure has shown the like for other liquids, and for a great number of solid bodies. It may be seen too in my Chemistry, vol. 1st, page 236, that a bladder, which is generally considered as an animal membrane least pervious to air, may be filled with one gas, and being some time exposed to the atmosphere, it will be found to continue full blown as at first, but the contents will be chiefly atmospheric air. Messrs. Allen and Pepys in their ingenious and excellent essays on respiration, have proved that when a Guinea pig, or a pigeon is confined, for an hour, more or less, in a mixture of hydrogen and oxygen gases in proportion as 78 to 22, a large portion of azotic gas is found in the residue and an equal portion of hydrogen disappears. They ascribe this change to effects of respiration; but it appears to me more probably due to the principle we are advocating; namely, to the egress of azote from the whole body, and the ingress of hydrogen in lieu of it, in consequence of withdrawing the external pressure of the former and substituting that of the latter.

"When the palm of the hand is placed over the top of the receiver of an air-pump, and the air is exhausted, the pressure of the air on the outside is scarcely felt, but the inside is swollen and feels as if it was drawn or sucked into the receiver. Thus the sensation is on the inside and not without; the reason is, there is no change of pressure on the outside; but there is within, and the consequence is a tendency of the air in the hand to escape into the receiver, which occasions the pain and swelling. It is thus also that the issuing of blood in the surgical operation of cupping is effected.

"Though it does not seem of much consequence what the pressure of the air may be on the animal frame, within certain limits, yet sudden changes must al-

* See article Asphyxia in the forthcoming Medical Cyclopedia.

ways be accompanied with uneasy sensation. Climbing mountains, or ascending in a balloon, removes a part of the atmospheric pressure from the body; this causes the air in the body to tends outwards, and sometimes occasions bleedings. To supply oxygen to the lungs a greater volume of air must be breathed, and this seems to produce an acceleration of the pulse. On the other hand, by descending thirty or forty feet deep into water in a diving bell, the pressure of the air upon the body is increased inwards; pains in the ears are felt from the difficulty of suddenly restoring a disturbed equilibrium; but if the descent is slow and interrupted, time is given for the air to enter the pores, and the pain is less sensible. To what limit warm-blooded animals could bear the rarefaction of air so as to subsist, has not, that I am aware of, been determined with much precision. Ascents in balloons have been made till the atmospheric pressure was reduced more than one-half. Formerly I found that a mouse could subsist in air of $\frac{1}{4}$ of atmospheric density, and seemed not to have suffered much; but upon reducing the density below $\frac{1}{4}$, the animal was convulsed and expired immediately, notwithstanding the air was instantly admitted.

"If the view we have expanded in this essay, in regard to the action of aërial pressure on the animal frame, be correct, it may be inferred, that the pressure admits of great latitude; perhaps an animal could subsist under the pressure of $\frac{1}{2}$ an atmosphere, or of 3 or 4, or more atmospheres. The uneasiness and danger would be found in the quick transition. If time is allowed for the air to enter the body, and to escape from it, the transition is gradual, and the sensation arising from it imperceptible. The animal economy would be adapted to it, like as in the transition from a cold to a warm climate. It may hereafter be found, what length of time is sufficient to adjust the equilibrium, and whether this subject is any way connected with certain diseased states of the body. As far as regards the absolute pressure on the body, and our insensibility of it generally, this question will be met by the argument, that the air within the body, by its elasticity, sustains a corresponding pressure from without; but this only accounts for our alleviation from a small fractional part of the whole exterior pressure. The greater part must still be supported by the body; and we must have recourse to the great incompressibility of matter, to account for our insensibility of pressure. Canton found that water, pressed by one atmosphere more than ordinary, only exhibited a reduction of 1-21740th part of the whole; if the same rate, applied to the compression of the human body, the reduction or compression of the size of a man, 4500 cubic inches, would only be 1-5th of a cubic inch, for the weight of an additional atmosphere. Now as the body consists of solids and liquids of almost incompressible matter, and there is only a small part of the volume consisting of elastic fluid that is compressible, no material change of volume can take place, but on the sudden transition from one atmospheric pressure to another; and unless a change of volume take place, we cannot feel any pressure, either inward or outward. The phenomena of the water-hammer show, that the particles of water are hard, as they strike each other like flint and steel; and it is exceedingly probable that other bodies, solids as well as liquids, are constituted in like manner. A general pressure on the system then, only increases in a small degree the attraction of the ultimate particles, and it is met by a corresponding increase of repulsion from the atmosphere of heat; so that the system remains, as nearly as possible the same, and unaffected by such pressure."

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4. *Quantity of Food taken by a Person in Health compared with the Quantity of the different Secretions during the same period.*—The Fifth Volume of the *Memoirs of the Literary and Philosophical Society of Manchester*, contains an account of a very interesting series of experiments on the quantity of food, taken by a person in health, compared with the quantity of the different secretions during the same period; with chemical remarks on the several articles; by John Dalton, F. R. S. The first series of experiments was made upon himself, in the month of March, for fourteen days successively. The aggregate of the

articles of food consumed in the fourteen days was as follows; of bread, 163 oz. avoir. oat cake, 79 oz.; oat meal, 12 oz.; butcher's meat, 54½ oz.; potatoes, 130 oz.; pastry, 55 oz.; cheese, 32 oz.; total of solid food, 525½ oz. avoir.; averaging 38 oz. daily. Of milk, 435½ oz.; beer, 230 oz.; tea, 76 oz.; total, 741½ oz. avoir. average 53 oz. of fluid daily. Thus it appears that the daily consumption was 91 oz.; or nearly 6 lbs. During the same fourteen days, the total quantity of urine passed was 680 oz. and the fæces, 68 oz.; the daily average is consequently of urine, 48½ oz. of fæces, 5 oz.; making 53½ oz. The quantity of food taken daily having been 91 oz., there remains 37½ oz. to be accounted for, which must have been spent by the insensible perspiration from the skin, and that from the lungs conjointly, on the supposition that the weight of the body remained stationary.

To try the effect of different seasons, Mr. Dalton resumed these investigations in the month of June the same year, and continued them for one week successively. The results were what might have been anticipated; a less consumption of solids, and a greater of fluids; a diminution in the evacuations, and an increase in the insensible perspiration. The following were the results, solids consumed in seven days, 236 oz.; average, 34 oz. per day; fluids, 391 oz.; average, 56 oz. per day. Total per day, 90 oz.; or 4 oz. less per day in solids; 3 oz. more in fluids than in the former trial. The daily averages in the evacuations were, urine, 42 oz.; fæces, 4⅓ oz.; leaving a balance of nearly, 44 oz., for the daily loss by perspiration, being an excess of about 6 oz. above that in the former season, or one-sixth more, owing no doubt to the higher temperature.

Another trial of a week's duration was made in September, with results nearly similar to the last. The daily consumption of food was, 93 oz.; and the perspiration one-half that quantity.

Mr. Dalton next varied the process, with the view to obtain the quantity of perspiration and the circumstances attending it more directly. He procured a weighing beam, by which he could weigh his body, so that the beam would turn with one ounce. Dividing the day into periods of four hours in the forenoon, four or five hours in the afternoon, and nine hours in the night, or from ten o'clock at night to seven in the morning, he endeavoured to find the perspiration corresponding to these periods respectively. He weighed himself directly after breakfast, and again before dinner, observing neither to take or part with any thing during the interim, besides what was lost by insensible perspiration; the difference in the weights, in this case, was the loss by perspiration. The same procedure was adopted in the afternoon and in the night. This train of experiments were continued for three weeks in November. The mean hourly losses, by perspiration were, morning, 1.8 oz. avoir.; afternoon, 1.67 oz.; night, 1.5. During twelve days of this period, Mr. Dalton kept an account of urine, corresponding in time with perspiration. The ratio was as forty-six to thirty-three, which is somewhat a greater disproportion than that observed in March; probably owing to the lower temperature of the weather in November.

These experiments were made forty years ago, but animal and vegetable chemistry being at that time in their infancy, no deductions of any interest could be made. The progress which this branch of physiology has since made, enables us now, however, to approximate very closely, to the quantities of the several chemical elements to be found in the great variety of products of the two kingdoms.

Bread and farinaceous vegetables appear to constitute the greatest part of ordinary food. Mr. D. has found that 5 lbs. of flour make 7 lbs. of bread. Now from the analysis of flour, Mr. D. estimates the carbon in bread at 30 per cent. Twelve ounces of bread, (the daily average in his first set of experiments,) must then contain 3.6 ounces of carbon. Seven ounces of oat-cake and oat-meal he estimates to contain 1.8 ounces of carbon; four ounces of pastry to contain 1 ounce of carbon; nine ounces of potatoes to contain nearly one ounce of carbon; four ounces of butcher's meat, and two ounces of cheese, together

about three ounces of carbon;* thirty-one ounces of milk, eleven-twelfths of an ounce. Twenty-two ounces of tea and beer would contain only a small fraction of an ounce of carbon, not easily estimated, and of little account by reason of its smallness. The amount of the element carbon then in some state of combination taken into the stomach, by the different kinds of food, was 11½ ounces.

According to Berzelius, the urine of healthy persons differ materially according to circumstances, but upon an average it may be reckoned to consist of 93 or 94 per cent of water; the rest consists of many substances; the carbon contained in which cannot be estimated at more than 1 or 1¼ per cent. from the analysis hitherto made. This will give .5 or .6 of an ounce of carbon in 48½ ounces of urine per day. According to the same chemist, fæces may be estimated as containing 75 per cent. of water, and the remainder does not seem to contain more than ten parts of carbon. This would give half an ounce of carbon in five ounces of fæces. Hence we may infer that one ounce, a little more or less of carbon, is carried off from the body daily through these two channels. The remainder 10½ ounces must therefore be spent in the insensible perspiration.

The quantity of insensible perspiration from the skin cannot be easily determined by direct experiment; but that from the lungs may be approximated from known facts.

Mr. Dalton has shown† that he produced by breathing in twenty-four hours, 2.8 lbs. troy of carbonic acid gas = .78 lb. troy, of carbon = .642 lb. avoirdupoise, = 10¼ ounces, nearly. He has also determined‡ that the quantity of aqueous vapour which he exhales from his lungs does not exceed 1.55 lbs. troy, = 1.275 lbs. avoirdupoise, = 20½ ounces avoir. If to this we add 10¼ ounces of carbon, we have 30¾ ounces for the carbon and water expended from the lungs in one day, and this taken from 37½ leaves 6¾ ounces per day, for the insensible perspiration from the skin, which if the above estimate be allowed, must consist of 6½ ounces water, and one-quarter of an ounce carbon. According to this, the matter perspired from the lungs is five times as much as that from the whole surface of the body.

If instead of carbon, we trace the element azote into and out of the body, it will appear that from the butcher's meat, cheese and milk, about 1½ ounces of azote was taken into the stomach daily, and nearly as much passed off by urine and fæces.

"Upon the whole we may observe," remarks Mr. Dalton, "that of the 6 lbs. of aliment taken in a day, there appears to be nearly 1 lb. of carbon and azote together; the remaining 5 lbs. are chiefly water, which seems necessary as a vehicle to introduce the other two elements into the circulation, and also to supply the lungs and other membranes with moisture. Very nearly the whole quantity of food enters into the circulation, for the fæces constitute only 1-18th part, of these a part bile, must have been secreted; one great portion is thrown off by means of the kidneys, namely, about half of the whole weight taken, but probably more or less according to climate, season, &c. another great portion is thrown off by means of insensible perspiration; this last may be subdivided into two portions, one of which goes off by the skin, amounting to one-sixth part, and the other five-sixths are discharged from the lungs in carbonic acid, and in water or aqueous vapour."

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5. *Six Children at one Birth.*—On the 30th of December, 1831, the wife of a man named Dernian Ploson, living in the village of Dropin, in Bessarabia, was delivered of six daughters, (the fruits of one pregnancy,) all living, and only a little smaller than the usual size of children at birth, with the exception of the last, which was much the least. The mother is not quite twenty years

* According to Gay-Lussac's experiments.
† Manchester Memoirs, Vol. II. New Series. ‡ Ibid.

of age, and of a strong constitution. The whole six children lived long enough to be baptised, but died in the evening of the day of their birth. The mother suffered from a severe indisposition subsequent to her confinement, but is now quite well.—*Gaz. Médicale.*

6. *On some of the Phenomena Attendant on Suffocation by Carbonic Acid in Man.* By Alfred S. Taylor, Esq., Lecturer on Medical Jurisprudence. Where this gas has been inspired in a state of great purity, death is an almost instantaneous result. It is seldom that any sound is uttered prior to dissolution, or that the being gives any indication of pain or suffering. According to the experiments of Sir Humphrey Davy, the gas does not, under these circumstances, penetrate into the pulmonary organs, the glottis closing spasmodically, and obstructing its entrance; but this experimentalist perceived a strong and pungent sensation in the mouth and fauces, while the gas had a distinctly acid taste. When diluted with air, the symptoms which it produces are those of narcotism, and the patient commonly dies apoplectic.* The incipient symptoms of poisoning by carbonic acid are not very often witnessed; but, from cases which have been published by M. Collard de Martigny and others, in the Archives Générales de Médecine, it would appear that giddiness, vertigo, ringing in the ears, with indistinctness of vision, commonly precede the state of insensibility in which those who have respired it have been found. Convulsions have not unfrequently been observed, and in those cases in which recovery has taken place there has often remained a partial paralysis of the muscles of the face or limbs, with stupor and head-ache.

The post mortem appearances exhibited in the bodies of those who have been poisoned by carbonic acid, are not of a very definite character. The surface has been usually found more or less livid, especially the face, which is described as being composed and tranquil. The animal heat is long retained, and consequently the cadaverous rigidity of the muscular system is a much longer time than usual in developing itself. The right side of the heart, and the great vessels connected with it, have been found gorged with blood. The vessels of the lungs and of the brain have also been found in the same state by various observers; but in the few experiments which I have made on animals, I have rarely witnessed that engorgement of the cerebral vessels which has been described by Portal and Mertzdorff. Where the lungs were excessively distended, the vessels of the brain contained but a small quantity of blood; and this I had occasion to observe more particularly in those cases in which the acid had proved fatal when respired in a diluted state. The appearances, it will be seen, do not differ from those of asphyxia generally; and hence, for the detection of the cause, we must rely upon general or circumstantial evidence.

There has been great variety of sentiment among experimentalists as to the precise manner in which this gas produces a deleterious action on the economy. By some it has been regarded as a directly poisonous agent; while Nysten, who is followed by Orfila, considers that the results of his experiments have established the contrary. This physiologist, who experimented largely on the gases, with a view to arrive at some precise data, in order to determine their mode of action, came to the conclusion that carbonic acid, like nitrogen and hydrogen, destroyed life merely by its negative influence on the system.

In order to determine the relatively poisonous properties of gases, Nysten adopted the plan of injecting them, in certain quantities, into the blood-vessels. In this way he was led to entertain the opinion that, while some exerted a specific influence, giving rise to peculiar symptoms, which were at the same time the rapid forerunners of death, others seemed to act more slowly, and to possess no essentially deleterious properties. Among the latter he placed car-

* These effects were observed to follow where three parts of the gas were diluted with seven of common air. It has been suggested by Dr. Paris, that a compound of this nature might be advantageously administered in certain diseases where sedatives are indicated; but I am not aware that this suggestion has ever been followed in practice.

bonic acid, and his conclusions with regard to the influence of this gas on the animal economy are, 1st, that it may be injected in comparatively large quantities into the venous system, without interfering with the circulation; 2d, that it exerts no primary action on the brain, but, when injected in a greater quantity than can be held in solution by the circulating fluids, it gives rise to a violent distention of the texture of this organ, and causes death by apoplexy; 3dly, that, when injected under proper precautions, it produces merely a general debility of the muscular system, which passes off after a few days. In the performance of these experiments, unless the gas be thrown in with care, death may result from the mechanical violence produced by the forcible introduction of an elastic fluid into the blood-vessels; but this effect must be contradistinguished from those effects which result from the specific properties of the gas, since in this way the life of an animal may be as surely and as rapidly destroyed through the injection of pure atmospheric air, as through the injection of any other elastic compound, however deleterious.

The conclusions of Nysten were for a long time regarded as correct, and physiologists readily embraced the opinion he had formed, namely, that carbonic acid was not, *per se*, a poisonous agent. More recent observations have, however, led to more perfect views on the subject; and, although many still adhere to the old opinion, yet the majority of those who have deeply reflected on the subject seem now to agree that carbonic acid has a directly poisonous action on the economy. Nysten himself admitted that, among those gases which he had classed as negatively destructive, there were some which, when introduced into the lungs, appeared to act in a different manner to others. Thus the carbonic oxide was found to destroy life more quickly than nitrogen or the nitrous oxide; while the proto-phosphuretted hydrogen and carbonic acid act with greater rapidity than the carbonic oxide. Now, it is impossible to reconcile these differences with the supposition that the action of the gases above mentioned is merely negative; and hence we must be prepared to admit that they possess certain properties, which more or less distinguish them from each other. If, for instance, it be affirmed that the action of carbonic acid on the system differs not from that of nitrogen, it ought necessarily to follow that these gases may mutually replace each other; but this, by experiment, is not found to be the case. M. Collard de Martigny has ascertained that an atmosphere formed of carbonic acid and oxygen cannot be respired, even for a very short period of time, without producing fatal effects; and from this it is reasonable to conclude that its operation on the economy must be of a positively deleterious nature. This conclusion is still further strengthened by other experiments, undertaken by the same physiologist. Having enclosed animals in an atmosphere of carbonic acid, he allowed them to respire freely the pure atmospheric air; but still he found that the usual symptoms produced by the action of this gas on the economy manifested themselves, although it had not entered into the respiratory organs, and therefore could not have acted in the manner assumed by those who maintain an opposite opinion. If it be a fact that carbonic acid is capable of exerting its peculiar influence through any texture of the body, there can be no longer a doubt as to which side of the question our judgment should incline. The intoxicating power of certain fluids impregnated with this gas, as well as the dizziness, vertigo, and other symptoms of cerebral disturbance, which the long-continued use of them induces, have been long known; but it has been only recently suspected that the carbonic acid, by its action on the mucous membrane of the stomach, may have a considerable share in the production of these symptoms.

Without dwelling upon the importance of these observations, it will be sufficient to conclude this paper by a notice of the very ingenious experiments recently performed by Professor Rolando, of Turin; for this, even if all other proofs were wanting, is sufficient to set the question at rest. This distinguished physiologist, having separated the bronchi in a tortoise, succeeded in making it respire carbonic acid by one lung, and atmospheric air by the other: the animal

died in the course of a few hours. To this experiment it may be objected that the respiratory process was impeded throughout one-half of the pulmonary system; and that, therefore, the animal may have perished, not from any positive action of the carbonic acid, but in consequence of the defective manner in which the process of respiration was necessarily conducted. In order to silence at once all objections on this head, the professor next secured by a ligature one of the bronchial tubes, having separated it from its fellow; and he found that the effects produced on the animal by the operation were but slight. The inference which he drew from the results of these interesting experiments was precisely that which was deduced from the preceding observations; namely, that carbonic acid has a directly deleterious influence upon the animal functions, in whatever way it may be introduced into the system.—*Lond. Med. and Phys. Journ. Oct.* 1832.

7. *Endosmose.*—M. Dutrochet has communicated to the Royal Academy of Sciences, a memoir on the power of endosmose considered comparatively in certain organic liquids. The author has employed in his experiments albuminous water and gelatinous water, the density of which was 1.01. The mean of ten experiments have shown that the power of gelatinous water is to that of albuminous water as 1 to 4. If we compare in this respect solutions of sugar, of gum Arabic, of gelatin and of albumen, of the same specific gravity, we find the relative power of endosmose of each to be represented by the following numbers:—

Gelatinous water	3.
Gum water	5.17
Sweetened water	11.
Albuminous water	12.

"My experiments," remarks M. D. "have proved that endosmose is one of the principal vital actions in vegetables; it is very probable that it is the same in animals." He founds this opinion upon the fact, that in these last, that the degree of vitality is greatest in the organs which are essentially albuminous, as the nervous system, and that it is very feeble in the gelatinous organs, as the bones, the cartilages, the tendons, &c. "May it not be," asks the author, "that the considerable difference which exists in the power of endosmose of the gelatin and albumen, is the source of certain physico-vital phenomena, which result from the organic association of these two substances?"—*Archives Générales, Oct.* 1832.

PATHOLOGY.

8. *Cases of Aphonia, depending upon an Affection of the Head.*—Dr. John Webster relates in the *London Medical and Physical Journal*, for October last, the four following interesting cases of this description.

Case I. George Wright, æt. 16, groom. When first seen, this patient had an attack of bronchitis, which was, however, soon removed by the exhibition of demulcent and aperient medicines, and the application of a blister to the chest: on the 14th of January last, he was considered free from all pectoral complaints.

Nevertheless, at this period an affection or weakness of voice showed itself; and, on the 16th, it became so remarkable that Wright could only with the greatest difficulty make himself heard by the bystanders, being scarcely able to speak, even in the lowest whisper. Notwithstanding the presence of this symptom, he did not complain of any pain in the throat or chest, nor was there any dyspnœa; but the patient now for the first time mentioned that he had a severe head-ache, accompanied by drowsiness and deafness; and, on examining the pupils of both eyes, they were observed to be very much dilated, and almost

insensible to the influence of light. It was from these circumstances that attention was especially directed to the cerebral symptoms, which ultimately led me to consider this affection of the head to be, in reality, a principal cause in producing loss of voice in this individual; and subsequent investigation, confirmed by the successful treatment adopted, demonstrated the correctness of the pathological views then entertained.

Five grains of the extract of conium were given at night, followed by an aperient in the morning; and a demulcent medicine was also ordered to be taken, twice or three times a day.

Little or no benefit, as might be expected, followed this mode of treatment: on the contrary, the loss of voice still continued, and it was latterly even so much affected that the patient sometimes could not articulate a single word; the air during these efforts to speak appearing to pass through the rima glottis, as if he were blowing a musical instrument, without a note being produced. It also merits observation, that if any alleviation of the pain in the head occurred, and especially if, at the same time, the pupils became less dilated, and were sensible to the impression of light, the voice invariably became stronger and more distinct; thus showing that the condition of the brain, and consequently the function of the nerves distributed on the larynx and glottis, was materially concerned in the disease; and, therefore, it appeared this affection of the head must first be removed, in order to restore the natural tone and strength of the voice.

In accordance with the above reasoning, a blister was applied to each temple on the 24th, which discharged freely; and the patient, when seen on the 26th, was found to have materially improved; the head-ache was almost gone, excepting over the right eye; the pupils appeared less dilated, and sensible to light, and the words, when speaking, could now be more distinctly articulated, although still in a low tone: the countenance likewise looked clearer, was not so anxious, and, to use the patient's expression, "he felt almost quite well," excepting the continued weakness of his voice.

Extract of conium, which had been taken for the last two nights, was continued, and an aperient mixture prescribed in the morning; at the same time, more nourishment was allowed, as the appetite and digestion had improved. On the 18th, the patient felt considerably better; the pupils contracted when exposed to a strong light, and the deafness and head-ache were almost removed; whilst the tone of the voice was nearly natural, and he articulated words correctly, although not strongly. A week afterwards, he had almost recovered his usual voice, had no head affection; and, when seen for the last time, in the middle of February, he was convalescent.

Case II. Mrs. Ellis, æt. 21, married, but without children. On the 15th of December last, Mrs. E. first consulted me as a patient, when she was affected by hysterical dyspeptic complaints, a slight cold, with an occasional cough; which, nevertheless, became one night so severe, that, in the violence of the attack, some slight streaks of blood were observed in the frothy expectoration; the bowels were costive, and the appetite impaired; but at this date there was not any affection of the head, and the voice was perfectly natural.

Camphor mixture, peppermint water, with aperients, were exhibited; and, after a few days, a blister was applied to the lower part of the chest and epigastrium. By these means the patient's health became much improved, her spirits got better, and although there was still an occasional cough, she was altogether relieved, and considered to be nearly convalescent. At this period, extract of hyoscyamus was ordered at night, and decoction of bark added to the antispasmodic mixture.

Early in January last, the voice was observed to be weak, but as she was then thought to be only affected with a common hoarseness, very little attention was consequently at first directed to the circumstance. However, on the 12th of the month, the voice became so feeble that even a single word could with difficulty be articulated; there was no pain of the throat, and she was free

from dyspnœa; but she now first complained of being deaf, with a feeling of noise in the ears, and considerable head-ache, occasionally accompanied by giddiness; and on examining the pupils of both eyes, they were found to be very much dilated, and nearly insensible to light; whilst, on inquiry, it was ascertained that at night she could with difficulty see by the light of a candle, being then, in fact, nearly blind.

At this stage of the disease, an aperient medicine was exhibited in the morning; afterwards decoction of bark with sulphuric æther, and extract of conium at night. By continuing these remedies for a few days, Mrs. Ellis improved a little in her general health; her voice appeared somewhat stronger, but it soon again became as weak as before, and could scarcely at last be heard; the pupils were anew dilated, along with dimness of sight, whilst the noise in the ears, and other head symptoms, already mentioned, again returned. In consequence of these circumstances, on the 2d of February a blister was applied to each temple, and a brisk purgative ordered at night, with a demulcent tonic mixture morning and evening.

The blisters discharged freely; after this, extract of conium and squill were given at night, and an aperient draught in the morning, to be repeated when found necessary. About a week after the application of the blisters, all the head symptoms were nearly removed, and the voice had almost recovered its natural tone and strength; the pupils appeared to be scarcely affected, and the patient could now see to read or work by candlelight; in short, she was considered all but convalescent. On the 12th of February Mrs. Ellis was free from any affection of the voice, and she therefore reported herself quite recovered.

The two following cases occurred some months subsequent to the preceding: they are of a similar character, were successfully treated in the same manner, and they fully confirm the views then entertained regarding the nature of this peculiar affection. The symptoms are related with more brevity, as any lengthened account would be superfluous, and is, indeed, not required to elucidate the subject. One remark, however, will not be here out of place: the two first cases occurred in winter, the latter during the warm weather of summer.

Case III. Dinah Swales, æt. 28, single; 7th June, 1832. Is of a full habit of body, and has had occasionally hysterical dyspeptic complaints. For the last ten days, has been affected with pain in the head, vertigo, and dimness of sight, at which period she began to lose her voice. At present, she can scarcely articulate so as to be heard, but has no pain of throat or dyspnœa. The pupils are dilated, almost totally insensible to light, and she cannot always see distinctly; besides noise in the ears, when flushed by exertion, she feels a throbbing at the temples, whilst the voice totally fails, and she is then almost obliged to express herself by signs. Tongue white; bowels open; pulse soft; skin natural; catamenia regular; feels dyspeptic, and complains occasionally of flatulency. For these complaints, in the first instance, she took compound rhubarb pill at night, with an aperient demulcent mixture, also containing camphor, morning and evening. Guided by the experience of former cases, on the 9th four leeches were applied to the forehead, and a blister to each temple at night; which remedies acted properly. Next day, there was evidently less dimness of sight, the left pupil was not much dilated, and the noise in the ears and vertigo were considerably diminished. The tone of the voice sounded decidedly stronger, and the articulation of words was more distinct; the appetite was now good, the bowels open, and there scarcely existed any dyspeptic symptoms.

The voice continued daily to improve, as likewise the sight, unless she was heated by exertion, when these symptoms were always observed to become worse. As the patient, in consequence of exposure to cold on the 14th, had a slight cough and expectoration, compound squill pill, with an aperient demulcent mixture, were prescribed, whereby these symptoms were quickly removed. On the 16th, the tone of the voice was improved, the patient felt nearly free from any complaint in the head, and had no affection of the sight, unless she

was hurried or fatigued; under which circumstances the voice became decidedly weaker. For these reasons, a second application of blisters to the temples was advised, and the aperient demulcent medicines were continued. When next seen, on the 21st of June, the blisters, it was reported, had discharged freely, and the patient was now entirely free from any head symptoms, whilst the sight and voice were perfectly natural; she was in fact convalescent; and it has since been ascertained there was no return of the complaint.

Case IV. Mary Joyce, æt. 40, single; 11th June, 1832. Is of a spare habit of body, and generally in the enjoyment of good health. About a fortnight ago, she began to lose her voice, whilst, at the same time, she complained of pain in the head, giddiness, noise in the ears, and dimness of sight, but felt entirely free from any pectoral complaints, and has not been low-spirited or hysterical. At present there is no dyspnœa, pain in the throat, nor any other symptom indicating an affection of the organs of respiration, excepting that the voice is exceedingly weak, sometimes scarcely audible; she complains, however, of pain in the forehead, over the right eye, along with the other symptoms described as having first appeared a fortnight ago, and the pupils are dilated. Tongue is rather foul; but the bowels are open, and catamenia regular.

Thinking it would be adviseable, in this case, first to try the effect of leeches, without blisters, six were accordingly applied to the centre of the forehead, in the same manner as I formerly recommended, with so decided advantage, in hooping-cough; at the same time, an aloetic and rhubarb pill was ordered night and morning. As the leeches did not bite properly, not much blood was extracted: however, the head next day felt less painful, the sight was improved, and the tone and strength of the voice seemed augmented; nevertheless the pills were ordered to be continued, and six more leeches to be applied, as before, to the forehead.

The second application of leeches was followed by considerable loss of blood; and on the 17th of June all complaint in the head had vanished, whilst the voice was strong, and perfectly natural; so much so, that the patient was discharged a few days afterwards convalescent.

Similar instances of extinction of voice are by no means uncommon; indeed, every medical practitioner must have met with them repeatedly in the course of his professional experience: generally, however, such complaints have been treated by remedies more immediately directed to the throat and parts adjacent, since these structures were apparently the seat of disease. Like other physicians, I have also formerly pursued this plan of treatment, when certainly it proved, in the generality of cases, both tedious and unsatisfactory, unless in individuals where there was actual disease in the larynx or neighbouring parts; then the commonly-followed method of cure should be recommended. But, judging from the details now given, and supported by other examples, which it is unnecessary, and would be tedious to relate, we may fairly conclude little difficulty will henceforward be encountered in treating affections of the voice, wherever any cerebral symptoms accompany the complaint, constituting a peculiarity doubtless of much more frequent occurrence than many are perhaps disposed to suspect, in consequence of similar symptoms being either overlooked, or not thought to be of sufficient importance to merit attention.

To illustrate the great influence affections of the brain have upon the voice, reference might be made to what occasionally occurs in public meetings; where individuals, after considerable exertion in speaking, or from mental excitement, will sometimes lose their voice entirely, and even suddenly, so as to be obliged to stop in the middle of a speech. Intoxication, fear, and strong mental impressions, will likewise deprive the person so affected, sometimes, of the power of articulation. And if such transitory cerebral influences can thus act upon the voice, it will surely, without much hesitation, be granted, that severe affections of the brain, or a more permanent disorder in the functions of the nerves distributed on the larynx and glottis, would produce similar, if not greater effects.

Anatomically considered, it will be admitted that any affection of the recurrent and internal laryngeal nerves must materially influence the voice; as these nerves constitute the chief agent, or moving power of that function. And we know, if any tumour press upon the above-named nerves, during their course, from the superior and lateral part of the medulla oblongata, to their distribution on the larynx and parts adjacent; or if these nerves should be cut by accident, or in experiments, the voice then becomes affected, or even destroyed. If such evident causes have so decided an effect upon the voice, other, or more temporary, may likewise produce similar results: at all events, these considerations should not be overlooked, as a paralytic condition, or any disease of these nerves, may as likely exist, as in those of the eye, the taste, or of motion. From these views, the propriety of cupping on the nape of the neck, and the application of blisters there, and to the occiput, in addition to the mode of treatment above detailed, appears evident; and in some cases certainly these means ought to be employed, since undoubtedly they must prove efficient and advantageous.

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9. *Case of Perforation of the Heart.* By James Hurd.—*October 9th*, 1831, *at* 8 *A. M.* I was requested to visit Richard Abraham, ætat. 63. On the previous day he had followed his usual occupation of breaking stones on the road, but on his return in the evening he complained of indisposition, and in the course of the night suffered from a fixed pain in the left side of the chest, which extended across the sternum and through the right side, but still he referred to the left side as the seat of this pain.

I found him lying on his back, his head and shoulders being particularly low, the surface of the body was cool, the pulse regular and natural, beating 84 in a minute, the bowels acting properly, no thirst, the tongue rather coated in its middle, respiration perfectly free and natural, no cough, the pain not increased either by attempting to cough, or by inspiring deeply, but slightly if he turned on the left side, no lividity or other change in the appearance of the countenance.

Suspecting that an inflammation of the chest, from previous exposure to cold, was about to declare itself, I ordered the position of the patient to be altered by placing pillows under the shoulders, the surface to be kept moderately warm, and some warm gruel to be administered with two calomel and colocynth pills; promising soon to make a second visit, to determine on the necessity of bleeding and such other measures as after reäction should be established might seem called for.

In about an hour from this time he complained of sickness; he was raised in bed, retched, appeared faint, and died without further struggle or complaint.

On the following morning I examined the body with the kind assistance of Dr. Burrows, and found the pericardium distended with full two pounds of dark blood, which was partly fluid and partly coagulated. The heart was found to be perforated near its apex so as readily to admit the little finger into the left ventricle; the edges of this perforation presented the irregular appearance of a muscular part forcibly torn asunder. The other thoracic, together with the abdominal viscera, were beautifully healthy—not the slightest vestige of present or past disease could be traced. I regret that the blood-vessels were not minutely examined, but in the ascending aorta, not far from the heart, I found two portions of ossification, which did not however involve any thing approaching a circular portion of the vessel. This man had suffered frequently from chronic rheumatism, and had complained of occasional pain in the chest, attended with palpitation.

Excepting the rent in the ventricle, I observed nothing morbid in the appearance of the heart, which is placed in Mr. Richard Smith's Museum at the Bristol Infirmary, but to be quite sure of this, I wrote to Dr. Richard, from whose kind reply I quote the following.

"* * * I perceived, of course, the perforation of the left ventricle. The muscular parietes appear otherwise to be in a sound state. The only morbid

phenomenon which is discoverable, is a plate of bone, being an ossified portion of the internal membrane, including one of the aortic valves. The heart certainly appears large, particularly the left ventricle, but I am not sure that the enlargement is to a degree that can clearly be said to constitute disease."—*Lond. Med. Gaz. Dec. 8th*, 1832.

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10. *On Emphysema of the Lungs in Persons who have been Strangled.*—Dr. Prus has presented to the Medical Society of Paris a memoir on this subject, which has been published in the *Transactions Medicales* for October, 1832. He has been led by his investigations to believe that among the serious lesions produced by strangulation, emphysema of the lungs, a not unfrequent result of that mode of death, according to him, is one of the most dangerous. The subject is one of interest, and deserving of further investigation.

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11. *Cases of Spontaneous Rupture of the Heart.* By Richard Townsend, M. D.

Case I. The body of a very old woman was brought into the dead-room of the Whitworth Hospital, for anatomical examination, on the 30th of August, 1830. The external appearance of the body did not in any respect indicate previous disease: on removing the sternum, the pericardium appeared unusually prominent, and of a bluish-white colour. When opened, it was found to contain more than half a pint of dark clotted blood, which completely enveloped the surface of the heart. When this coagulum was removed, the heart appeared of its natural size, but was enormously laden with fat, especially at its basis and over the right ventricle. On the anterior surface of the left ventricle near its septum, and at the distance of about an inch from the apex, a longitudinal fissure, half an inch in length, was discovered, the edges of which were jagged, and had evidently been separated by tearing; there was a slight degree of ecchymosis under the serous membrane, in the immediate neighbourhood of the wound. On laying open the left ventricle, it was found that the fissure seen on the external surface extended through the fat and muscular substance, into the interior of the left ventricle. This cavity was quite empty, all its blood having previously escaped through the wound. The length of the fissure on the internal surface of the ventricle was somewhat greater than on the external surface, but corresponded with it exactly in other respects, being a mere cleft or clink just wide enough to admit the handle of a scalpel. The lining membrane in the neighbourhood of the rupture was soft and friable, and the columnæ carneæ, for about the circumference of a shilling, were of a dull white colour, and so soft as to break down under the scalpel. The left ventricle was of its natural dimensions, and its parietes of their ordinary thickness, but the muscular fibres were pale, soft, and flabby. The other cavities of the heart presented their usual appearance, except that the muscular walls of the right ventricle were as thin as paper, and coated with a layer of fat nearly half an inch deep. The valves were all remarkably healthy for a subject so far advanced in life. The coronary arteries exhibited several patches of atheromatous deposit, sufficient in many points to diminish their caliber considerably. The arch of the aorta was dilated and atheromatous. The other viscera were all healthy, and the muscles of the trunk and other extremities appeared even more firm and florid than is usually observed in persons of her great age.

Upon inquiring into the previous history of this individual, it was ascertained that she was ninety years of age, and had been a servant in the house of industry for many years; her usual occupation was that of scouring the floors; she always enjoyed excellent health, with the exception of an occasional slight cough. In her eighty-eighth year she fractured her thigh near the trochanter, but completely recovered from the effects of that accident in the usual time.

On the morning of her death, she went to the chapel in as good health and spirits as usual, and, while in the act of saying her prayers, she suddenly dropped down dead without a struggle or a moan.

Case II. Another case, of a similar nature to the preceding, occurred in the

same establishment on the 5th of March, 1832. The subject of it was a large athletic man, ætat. 84, who had served twenty-six years in the navy, and after a long life of hardships and vicissitudes, was admitted four years ago into the pauper wards of the House of Industry. During the time of his residence in this establishment, his health was uniformly excellent, with the exception of a slight sensation of uneasiness which he occasionally felt in the left side, in the region of the heart. The night before his death, he complained of a return of this pain, and of difficulty of breathing. Next morning these symptoms had totally disappeared, and he got up at his usual early hour, in as good health and spirits as he had enjoyed for many months previously. He went to chapel, walked afterwards in the yard for about two hours, returned to his ward, and while in the act of cutting tobacco at the end of the table, and in conversation with one of his comrades, he suddenly fell down, and expired instantaneously. His family are represented to be remarkably long-lived; there is a sister of his at present in the House of Industry, in her eighty-sixth year.

On opening the body, the only morbid appearances were found in the thorax. The parenchymatous structure of the lungs was rarefied and emphysematous, as is usually the case in persons of his time of life. The pericardium was greatly distended, and occupied the principal space of the lower part of the left side of the thorax. On slitting it open, a large quantity of black blood, partly coagulated and partly fluid, was found occupying its interior. The heart was rather larger than the fist of the patient, but its increase of size was chiefly attributable to a large quantity of fat which was developed on its surface, principally about the origin of the great blood-vessels and along the septum ventriculorum, in both which situations it measured near half an inch in thickness. The muscular substance of the heart was generally pale, exsanguineous and flabby; in the right ventricle the walls were as thin as paper; in the left they retained their usual thickness. The coronary arteries were ossified, and the ossification extended even to the minute ramifications which went to the apex of the heart. On the anterior surface of the left ventricle, about an inch from the septum, and the same distance from the apex, a rupture of the parietes was discovered, half an inch long, and several lines wide: this opening was nearly closed by one of the columnæ carneæ, which was torn across and projected through the external orifice. The muscular fibres in the vicinity of the rupture were in a state of perfect ramollissement, but neither on the external or internal surface was there any unequivocal appearance of ulceration. There were two patches of ecchymosis as large as half-crowns, under the serous membrane on the surface of the left ventricle. No other morbid appearances were observed. Not the least remarkable circumstance in the history of these two cases is the sudden occurrence of the fatal accident in the midst of apparently sound health, not preceded by any premonitory symptoms, or brought on by any moral emotion, or physical exertion. But though there were no evident symptoms of organic disease manifested during life, there was abundant evidence, on dissection, that the structure of the heart was materially altered from its natural condition. The coronary arteries were extensively diseased in both cases, and the supply of arterial blood which they transmitted was, consequently, inadequate for the due nutrition of the muscular fibres of the organ, which were accordingly soft, pale and flabby; and, as usually happens in such cases, an inordinate quantity of fat was deposited on the surface of the heart, as if to compensate for the atrophy of its muscular substance.

In the greater number of cases where rupture of the heart has been observed to occur, it has been immediately preceded by some moral emotion, or physical exertion, or concussion, as its immediate cause, to which the accident is generally attributed. Nicols, who gives a very clear and succinct account of the rupture of the heart which caused the death of George the Second, attributes the accident to the efforts made while straining at stool.—*Phil. Trans.* vol. lii. part I.

A similar accident terminated, not long since, the existence of a late eminent

barrister of this city. Bertin mentions a case of rupture of the right auricle, caused by falling out of a window; and Haller and Morgagni have known the heart ruptured during violent paroxysms of pain, and the convulsions of epilepsy. These causes, however, can scarcely be conceived sufficient to produce such a formidable effect, unless where the organ was predisposed to rupture by some preceding lesion; and where such predisposing cause is strongly marked, the ordinary force of the heart's contractions may be sufficient to determine its rupture, as in the present instances.

From the reports which have hitherto been published of this fatal accident, it appears that the true cause of the rupture is most comonly attributable to the parietes having been previously eaten away to a certain depth, by ulceration. The ulcerative process may commence either at the external or internal surface of the heart, or may attack both surfaces at the same time, and continue to burrow until both ulcers meet, and so complete the perforation. This species of rupture may be considered analogous to the perforation of the stomach and intestines, from the successive ulceration of their coats.

Andral mentions, in his Treatise on Pathological Anatomy, that the French pathologists generally enumerate the excessive deposition of fat on the surface of the heart among the causes which predispose to its rupture; but this opinion, he conceives, should receive further confirmation before it is finally adopted, as the only case in point to establish the fact is that related by Dr. Gratiloup, of Bourdeaux, (in the Archives Générales for 1822,) of a curate of that town, who died suddenly in his bed of rupture of the right auricle, the heart being at that time prodigiously laden with fat. The case which I have related would seem to support the doctrine that the excessive deposition of fat on the surface of the heart, especially when accompanied, as it usually is, by atrophy and softening of the muscular fibre, may render it susceptible of being easily torn and ruptured. But even admitting this supposition, it still remains to be explained why it is not in the auricles, or in the right ventricle, where the muscular parietes are thinnest, and the fat most abundant, that the rupture generally occurs; but about the middle of the left ventricle, where the fat seldom accumulates in any great quantity, and the muscular coat is particularly thick and strong. This circumstance would seem to prove that the rupture of the parietes in these cases should not be regarded as a mere mechanical effect produced by their overdistention, but rather as an active process in some degree analogous to the rupture of the uterus, from excessive contraction of its fibres.

Perforation of the heart, from whatever cause it proceeds, is generally followed by immediate death. Bertin states, that of ten cases of this accident, eight died instantaneously, and the other two after a few hours. The extent of hæmorrhage into the pericardium cannot account for these fatal consequences, as the quantity of blood effused is often very trifling. The great and sudden shock which the nervous system sustains is more probably the immediate cause of death. In some rare cases, death does not take place for several days after the accident. It is stated that, in these cases, the perforation has been found plugged up with a coagulum of fibrine. *(Andral.)—Dub. Journ. of Med. and Chem. Sciences.*

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12. *Death from Asphyxia, caused by Large Tuberculous Masses Developed in the Parietes of the Left Auricle, compressing the Trunks of the Pulmonary Veins so as to reduce their Diameter to that of a Crow-quill, thereby Preventing the Return of the Blood from the Lungs.* By Richard Townsend, M. D.—John Larkin, a poulterer, æt. 62, states, that he has occasionally suffered from cough and shortness of breathing for several years past, but that he never felt seriously ill until about twelve months since, when, after putting on damp clothes, he was seized with cough, dyspnœa, palpitations and profuse hæmoptysis: for these symptoms he was bled copiously; the hæmoptysis ceased after the second week, and has not since returned; the cough likewise abated considerably, but the palpitations and dyspnœa continued to recur at irregular intervals throughout the

remainder of the winter and spring; during the summer he was so much better as to resume his ordinary occupations, but since the commencement of the present winter, (1829,) his breathing has become habitually short, and at times he has been so oppressed, for hours together, as to make him suppose each succeeding gasp must be his last; states, that these violent paroxysms are brought on by changes of weather, flatulence, or mental vexations; but never had chills, night-sweats, nor diarrhœa.

The following is a summary of the principal symptoms which he presented during his stay in the Whitworth Hospital, to which he was admitted on the 18th of December, 1829. He was excessively emaciated, and was constantly annoyed with a short, dry, harassing cough, his breathing was extremely variable, and, as he himself remarked, materially affected by the state of the weather: during the two or three frosty days that occurred in the first week of January, he was so well as to walk down stairs and take several turns in the garden; but during the damp weather which succeeded, his breathing was frightfully oppressed in paroxysms, resembling the most violent attacks of spasmodic asthma. His pulse was never less than 100 in the minute, weak, compressible and regular. The heart's action, as heard by the stethoscope, was extremely feeble, and could with difficulty be heard fluttering faintly, and apparently at a great distance behind the sternum; in the epigastrium its action was rather more perceptible, but its sound and impulse were so excessively feeble and indistinct that it was impossible to analyze them. The sound on percussion was remarkably dull all over the thorax. During the last fortnight of his existence, no respiration could be heard in any part of the left lung; in the right it was puerile for about two fingers' breadth under the clavicle, lower down it was extremely feeble, and almost completely marked by a subcrepitating râle. At this period he was obliged to sit bolstered up with pillows, and had regularly a frightful paroxysm of suffocation at midnight. His strength now failed him completely; his face assumed a livid cadaverous aspect; his ideas wandered, and became incoherent; and he died asphyxiated about five weeks after his admission into hospital.

Of all the remedies which were employed, blood-letting alone seemed to afford him even temporary relief, but the smallest abstraction of blood was, latterly, followed by such extreme prostration of strength, that its employment was renounced altogether. Antispasmodics and counter-irritants seemed to produce no effect whatever on his symptoms.

On dissection made twelve hours after death, a considerable quantity of serous fluid was found effused on the surface of the brain. On opening the thorax, the lungs appeared to fill the cavity completely, the superficial cells on their anterior surface were considerably dilated, laterally and posteriorly; the lungs at each side were firmly attached to the costal pleura; the medium of attachment was of the colour and consistence of cartilage. On removing the lungs from the chest, they appeared externally of a dark red colour, conveyed a distinct sense of fluctuation to the finger, and felt remarkably heavy. When the left lung was cut into, an immediate gush of blood followed, as if the incision had been made into an aneurismal sac. The quantity of blood which escaped could not be less than three pints and a half; after it had been removed, the pulmonary veins from which it flowed were seen traversing the parenchyma of the lung, dilated to at least four times their natural size; those veins which are naturally no bigger than crow-quills, being as large as the fingers of a glove. On tracing the dilated veins towards the root of the lung, the dilatation was found to extend uniformly from the smallest branches to the main trunks, which formed two large sinuses outside the left auricle. The right lung presented a similar appearance, but in a minor degree. On examining the heart, the dilatation and congestion of the pulmonary veins were found to arise from the compression which they suffered at their entrance into the left auricle, the parietes of which appeared converted into one solid unyielding mass of tuberculous matter, nearly one inch in thickness: this morbid production was developed between the outer

and inner membranes of the auricle, and, by the pressure which it made on the pulmonary veins, diminished their caliber so much, that a probe could with difficulty be passed through them into the auricle. The consequence of this constriction of the veins at their orifice was, that the blood, which was thus obstructed in its return to the heart, accumulated in the trunks and minor branches of the veins in such quantities as to produce the enormous dilatation of those vessels which I have endeavoured to describe. The right auricle and ventricle were considerably dilated; the heart in other respects appeared healthy. The bronchial glands were much enlarged, and filled with tuberculous matter. The lungs contained only a few miliary tubercles. The abdominal viscera did not present any unusual appearance.

I have thought this case deserving of being recorded, as it serves to illustrate a morbid condition of the heart and lungs of extremely rare occurrence, and likewise as exemplifying a pathological fact, which I have had repeated opportunities of observing, namely, that a permanent organic lesion may give rise to symptoms of a remittent, or even of an intermittent character. In this instance the mechanical obstruction to the pulmonary circulation, and the consequent congestion of the pulmonary tissue, must have opposed a constant obstacle to the due aëration of the blood, and yet the symptoms of distress were only felt occasionally, or at least were greatly aggravated at intervals. In like manner, I have known aneurism of the abdominal aorta distend the nervous filaments of the solar plexus to such a degree as to lacerate several of them, and yet the pain experienced in this case occasionally intermitted for whole weeks together.

I have searched in vain in modern authors for the description of a state of the heart and lungs, such as I have recorded; but in Sprengel's erudite History of Medicine, I find mention made of a case almost precisely similar, which was reported by Maurocordatus, a Turkish physician, in the year 1664, and is thus described by Sprengel, (Histoire de la Médecine, traduite par A. J. L. Jourdan, tom. iv. p. 129.) "Aux vingt-six raisons qui Maurocordatus allégue en faveur de la circulation pulmonaire, il ajoute encore une observation faite par lui-même sur le cadavre d'un de ses maîtres. Cet homme était mort d'un asthme suffocatoire, on trouva les poumons singulièrement distendus, l'oreillette pulmonaire cartilagineuse, le ventricule gauche vide, mais les veines pulmonaires gorgées de sang; il en conclut que ses dernières raminent le fluide du poumon." From this description it appears, that not only was the organic lesion similar, but that the symptoms which it produced were likewise those of spasmodic asthma.—*Ibid.*

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13. *Effects of Tic Douloureux on the Mammæ and Testes.* By S. Hood, of Brighton.—The first few cases of diseased testicle accompanying neuralgia of the sciatic nerves, I believe to be only an accidental circumstance; an opinion, which, I apprehend, is pretty generally entertained respecting cases of this description. In five out of eight consecutive cases of diseased testicle, with neuralgia of the sciatic nerves, this gland had become small and soft; while in the remaining three it was hard and enlarged. In cases of this kind the patient seldom complains of pain in the testicle, and is, indeed, generally quite unconscious of its being diseased. Recently a gentleman consulted me for tic douloureux of the left cheek and side of the head, which had recurred at intervals for seven years. After having detailed his sufferings, on being asked if there were any disease of the testicles, he congratulated himself, with much apparent satisfaction, on being "all sound there." Finding his assertion doubted, he submitted to an examination, when he discovered, to his mortification, the left testicle quite soft, and only about half its natural bulk. In every other respect this was a robust, healthy man, therefore the softening of the testicle could not be referred to constitutional debility; besides, in the course of a month, great mitigation of pain being procured, the testicle resumed its glandular structure, and very nearly its natural size. When the neuralgic attack is violent, it is probable that the testicle becomes sometimes affected at a very early period of the

disease, for in one of the above-mentioned cases it was found lessened and soft on the tenth day of the disease. It is necessary, however, to add, that in this instance the sciatica was combined with the ilio-scrotal neuralgia of Chaussier; but the sub-carbonate of iron restored the testicle to its natural size and hardness in four days.

I have had no opportunity of ascertaining whether sciatic neuralgia causes any alteration of the mammæ in women; but the following inveterate case of tic douloureux, abridged from the patient's own statement, leads to a suspicion that they sometimes sympathize with neuralgia of the face:—

"I have head-aches of every description—sick, rheumatic, nervous, or what I call eye-aches, which are my eternal torment. Though the pain seems seated in the right eye, yet pressure on it sends a soreness and pain darting into my head, and extending all over this side of my head, face, teeth, gums, tongue, throat, and roof of my mouth, so that life is really a burthen. The veins of my brow swell like cords, and my eyes are red and inflamed, my stomach feels always sick, the retching is very violent, and often, though not always, do I bring off the contents of my stomach. These attacks last from three to six days, and nothing that I know can save me from an attack, or alleviate or shorten its duration. Before, after, and during the attack, the top of my head is as sore as it is possible to be, and there, as also wherever the pain had been, I feel an itching. The nostril is dry and stuffed, and the skin peels regularly off my lips. The symptoms of an approaching attack are generally the itchy soreness on the top of my head, itching and creeping about my face, coldness of my nose, and a teazing tickling in my throat; yet sometimes I have all these symptoms and escape, and at others I am attacked without any notice whatever. The causes of an attack are equally uncertain, that is, to my observation; I generally attribute it to cold, of which I am miserably susceptible; not that I feel cold readily, that I do not, but I think that I catch cold for a very trifle. I cannot go out of doors, I cannot bear a breath of air; it seems to me to be air, not cold, that hurts me. I cannot walk up and down the room, or allow any one to pass and repass me, for the agitation of the air seems to *strike* my eye and temple; and this I feel be the weather warm or cold; more frequently, I think, in the former, for the weather must be cold indeed if I am not in some degree of perspiration. A cold in my head I never have; my feet, legs and knees are the only places where I feel cold, and they are dreadfully so; let me do what I may, they are like ice; fire heat will scorch, but not warm them.

"Till lately I fancied myself free from any fatal disease, but now I fear I have something the matter with my heart; I feel an uneasiness all about it, nor can I lie for any time on the left side; the pulsation is very irregular; at times it beats strong and quick, at other times it seems to stop altogether, which takes away my breath, and is followed by what I can hardly describe, a quick, gurgling noise at my heart, just as if a narrow-necked bottle of water were upset, when I feel suffocating, and have been so bad as to lay hold on the first thing within my reach to support myself; but I am not very well able to describe what I feel about my heart.

"My health and even mind is in a wretched state; at times I feel so miserable, such a load, such an oppression on my mind, and compression in my head, such an inability to move, read, write, think, or, in fact, to do any thing, that I really fear I shall go distracted. My memory is gone; every thing, the most trivial, is a dreadful labour, a task, a something which I am afraid to undertake. The state of my mind is indeed as deplorable as my health, but to express the intensity of pain, which I generally endure, is quite impossible. I do not think I was ever so thin in my life, I am quite wasted away, and if I were to date the time when my health got so very bad, it would be in 1827, but if my memory serves me right, my ailment began as far back as 1817, and I think I caught it in a current of air, while sitting between wet mats of scented grass."

Several important symptoms are omitted in the above statement of this case,

but it is sufficient for the object in view to mention only one of them. The left mamma was so nearly obliterated, that it was with difficulty a trace of it could be distinguished. Though this case has not been cured, yet one interval of a month, and another of six weeks, having occurred between the attacks, the left breast not only grew perceptibly, but became rather the largest of the two. This lady's washerwoman was also afflicted with tic douloureux, confined to the second branch of the fifth pair of nerves on the left side; her right breast is wasted, and lactation quite stopped.

In the case of a third female, whose left breast was wasted, and the milk very scanty in it, there was a violent neuralgic affection of the right brow. Another woman, who had no milk in her left breast, had been subject, for several years, to a violent pain on the top of her head; but, in this case, the function and natural size of the breast had not been restored with the removal of the pain. Although it appear a far-fetched conclusion to attribute these alterations of glandular structure and function to neuralgia of a remote nerve, or branch of a nerve; yet it is not very probable, that so many cases of this kind should occur, fortuitously in succession. If these alterations occurred only after long suffering, and when constitutional debility is apparent, they might be referred to this cause; but they happen sometimes before any constitutional effect is produced. Again, the sudden reconstruction of these glands, which often follow the removal or alleviation of neuralgia, would indicate that they are in some way implicated in the previous morbid action. On the other hand, it is certain, that even the cure of neuralgic affections does not invariably restore the natural structure of either the mammæ or testes.—*Lond. Med. and Surg. Journ. Nov.* 17, 1832.

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14. *Protracted Case of Habitual Constipation.* By S. Staniland, Esq.—Mary Belmore, aged seventy-three, the wife of a labouring man, requested my advice for "an obstinate costiveness," as she termed it, and gave me the history of her complaint, nearly in the following manner:—

At about twenty-four or twenty-five she could not command a daily motion without the assistance of some purgative medicine, which she generally bought at the druggist's, either jalap, rhubarb, or aloes, but even these in the course of time lost their virtue, "unless she took," as she expresses herself, "as much as would poison a dozen ordinary men:" from two days the interval gradually increased, though unaccompanied with any very unpleasant symptoms, except flatulence and occasional dull, heavy pain on the right side, (I suppose the head of the colon from her description, and pointing to the spot,) and flying pains from the flatulence, until it became a month; and for the last five years, once in two months, not regular to two or three days. Even before my advice was solicited, a medical practitioner here, just antecedent to the last obstruction, had attended her for the complaint, which had not then been relieved for four months and eight days: she told me that he had been successful in purging her, and that she "must have parted with at least a bushel;" but that she would sooner die than undergo again what she suffered from the effect of the medicine, and that unless I could do something for her, which would act speedily and easily, she would not take any thing: this was about a month after the purged motions, and she has had several since, though not at regular intervals. I sent her a box of pills of calomel, ext. colocynth, ol. croton, and cloves; but whether from the trouble of taking them, or their nauseousness, she neglected their use, and as she had comparatively little or no pain from her complaint, week succeeded week, and month to month, until full *seven months* had passed over without the least discharge from the bowels. Some weeks before her death she had a fall, and hurt her right side, (no doubt, particularly the head of the colon,) of which she had complained ever since, the pain gradually getting worse and worse, so that she could not bear the least pressure, and at length was obliged to keep her bed. She died in a few days under the most excru-

ciating pain in the head of the colon from inflammation, which terminated in gangrene of one spot about the size of a crown, from which the fæces had escaped, and were found amongst the intestines on the right side.

The friends gave me liberty to inspect the body after death. Its size was like that of a half hogshead, and as protuberant as that of a dropsical person, as hard as a drum, with the skin as tense as it seemed possible to draw it, and quite polished. I made a longitudinal incision from the ensiform cartilage to the pubes, and a cross one from side to side: the muscles were quite absorbed, and the skin and peritoneum perfectly transparent, and each as thin as a wafer, so that they might almost be torn like paper.

The spectacle which presented itself was very singular, but consistent with what might have been expected: the sigmoid flexure of the colon was so much enlarged with flatus at its upper part as to become quite displaced from the left side; but taking its curve as usual on the left side above, the upper part lay completely across the abdomen, like the transverse arch, but upon that part: when it had got to the right side, it again curved towards the left ileum, or rather to the middle of the pubes, and terminated in the enlarged rectum at the bone of the sacrum. Its upper part, which crossed the abdomen, was so distended with flatus as to be nine inches in diameter; and the lower part, which descended to the rectum, and was filled with pultaceous fæces, was about ten inches and a half, but where it joined the rectum six inches. Nothing could be seen on first opening the abdomen but this portion of the intestine; a small part of the ileum, where it joins the head of the colon; the enlarged head of the colon and the anterior part of the enlarged rectum, the latter seen only because of its enlargement. The rectum was six inches in diameter above, gradually getting smaller towards the anus, which would not more than admit the thumb, though immediately above, it completely filled the cavity of the pelvis. The head of the colon was about nine inches in diameter, and it, as well as the transverse arch, was filled, (I ought to say crammed,) with fæces of moderate consistence, having only a few scybala, not sufficient to have produced irritation as a cause of the prevailing inflammation. The stomach, though an immense cul-de-sac, and appearing as if it had been much distended, was more than half empty, and the duodenum, jejunum and ileum quite so, and their coats perfectly healthy, only thickened in their muscular and mucous structures, as were also the large intestines. The fæces were not inordinately offensive, considering the length of time they had remained in the bowels, nor, excepting the rectum, were they near so concrete as might be expected; but in this gut they were literally as hard as wood, and would require the chisel or hammer to break them in pieces.

Her appetite had always been tolerably good, nor did she refrain from any common diet that presented itself, though generally she lived on fat pork and vegetables.—*Lond. Med. Gaz. Nov.* 24, 1832.

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15. *A New Species of Emphysema developed after abundant Hæmorrhage.* By M. E. Rebolle de Gex.—Case I. *Profuse epistaxis; death; gas in the whole venous system.*—Ducret, æt. 15, was admitted in the Hôtel-Dieu, with continued inflammatory fever, which was relieved by leeches, abstinence and rest; but it was followed by an attack of quotidian fever, which quickly yielded to the exhibition of salicine. The patient was still occasionally subject to epistaxis, with which he had been attacked previous to the occurrence of the fever; and, at the time he was about to quit the hospital, he was found in the night bathed in his blood. The quantity of blood he had lost was very great. The nostrils were immediately plugged, and the patient was thus saved from immediate death.

On the following day, he was in a state of great exhaustion: the eyes were dull, his strength gone, and the pulse at the wrist thready and wavering; it was evident that he could not long survive. In the course of the day, general œdema began to be manifested: he became weaker and weaker, and died on the third day.

Dissection fifteen hours after death.—The body presented no appearance of putrefaction. Almost every part was œdematous; the lungs most so, and next the cellular tissue. In the right auricle and ventricle of the heart, a clot of feeble consistence was found, and of a light colour: this clot was emphysematous; it contained numerous small cells. A smaller clot, of the same kind, was found in the left auricle. The vena cava, subclavian, axillary, and internal jugular veins, as well as the iliac and femoral, contained, in different points of their course, many small bubbles of air, which were separated from each other by small drops of blood, the colour of which was less black than natural. This appearance was more marked in the smaller veins: it resembled a spirit of wine thermometer, into which air has been inserted bubble after bubble. Upon dividing the vessels, gas escaped mixed with blood. No air could be detected in the arteries.

Another case of a similar kind, and experiments upon animals, lead to the same conclusion, that gas is present in the circulating system after profuse hæmorrhages. But what is the nature of this gas? Is it atmospheric air introduced by absorption, or is it the result of spontaneous formation, consecutive to hæmorrhage? This question might have been solved by chemical experiments; but M. Rebolle, probably, could not collect a sufficient quantity of the gas for that purpose. He shows, by the following experiment, that the gas could not be atmospheric air absorbed by the vessels from which the bleeding proceeded. After having exposed the two crural veins of a young dog, he plunged him up to the neck into a bath at twenty degrees; he then divided the crural veins, and the crural artery, without removing the creature from the water. After death, the heart and venous system contained gas, as in other cases. Still this experiment does not show, as M. R. imagines it does, that the presence of the air must be attributed to pulmonary absorption: he should first have proved the existence of atmospheric air, or its element, in the blood-vessels. But whatever may be the cause to which we attribute the presence of air in the blood-vessels, the following case cannot be uninteresting.

Case II. *Schirrous tumour on the back; removal of it followed by considerable hæmorrhage; emphysema; death. The emphysema depending on the presence of inflammable gas.*—Duclos, æt. 25, of a strong constitution, had a very large tumour removed from his back, on the 25th of February: the tumour was very extensive, and the operation lasted forty-five minutes. There was great difficulty in securing the divided vessels, and the hæmorrhage was profuse. For a long time the patient remained in a state of alarming syncope.

26*th.* Rather better; belly supple, retracted, and not tympanitic. The trunk of the body and the limbs were a little augmented in size, and crepitated upon being pressed; the impression of the finger was immediately effaced. The crepitation was so distinct that, when the nurses were assisting the patient to rise from bed, they thought some of his bones were fractured; and the same noise continued until his death, every time he moved. The dressings were soiled by a reddish-looking serum, which flowed abundantly from the wound.

From this time, the progress of the case was unfavourable: a gangrenous odour issued from the wound, and the man died on the 28th.

Dissection six hours after death.—Thermometer indicating two degrees above zero. Emphysema less evident than during life, and only visible in the scrotum and at the upper part of the thigh on the side operated upon. At these parts the skin was tense, and elevated by numerous small phlyctenæ, close together, and containing reddish serum. The flaps of the wound had not adhered to the parts beneath; they were livid, and partially gangrenous. In every point of the cellular tissue where a bistoury was introduced, gas escaped, and, upon the approach of a candle, there was a slight detonation, and it burnt with a brilliant flame of a bluish-white colour, whiter at its summit and bluer at the base. From the scrotum and the left thigh the jet of gas was stronger, and lasted longer. The gas was completely inodorous. Muscular system healthy, but the colour of the muscles not so red as usual, and their fibres were separated by well-

defined intervals. When cut upon, the same kind of sound was produced as upon the division of muscles that have been slightly frozen. When the muscles were pressed before a light, there was a sparkling and cracking like that which is caused by squeezing out the essential oil from orange-peel before a taper. Upon opening the head, the cerebrum powerfully raised the dura mater; and wherever this membrane was divided, a hernia cerebri occurred. The brain was light, and when an incision was made into its substance, a slight noise was heard, similar to that from the section of the muscular tissue; but, upon pressing portions of the cerebral substance before a bougie, neither crackings nor sparks were produced. No gas in the cavities of the heart. In the right auricle and ventricle were two coagula; the largest was in the ventricle, and its size was about that of a filbert. This coagulum was emphysematous; for upon being brought into contact with a light, and pressed, sparks were emitted and a crackling noise. The blood-vessels were empty. The small transparent veins appeared to contain the same gas. The abdomen was slightly tympanitic, and upon being punctured, and a light brought near, a clear and bluish smoke was seen, and the puncture was slightly enlarged by the combustion of its edges, which were also blackened. The small intestines contained a very trifling quantity of pus.

It is to be regretted that an accident happened to a vessel in which some of the gas was set aside, for the purpose of ascertaining its precise nature.

This case certainly merits the attention of physiologists, if it were only on account of the presence of the inflammable gas; and those physicians who have thought that spontaneous combustion depended upon inflammable gas being developed in the cellular tissue will here find some support to their theory.—*Gaz. Méd. Tom. III. No.* 103.

MATERIA MEDICA.

16. *Experiments on Hemlock and Henbane.*—Professor Geiger, of Heidelberg, whilst recently engaged in making chemical experiments, succeeded in establishing some remarkable illustrations of the active principle of hemlock. Its base is an organic salt, which opens an entirely novel series of these highly interesting organic substances, for it is volatile, and similar to a volatile oil. The peculiar qualities of this substance, both intrinsically, and when brought into combination with acids, its rapidly changeable character, and the brilliant play of colours which it exhibits whilst undergoing change, render it one of the most interesting productions in organic chemistry. Its poison is of the deadliest description. The smallest quantity, applied inwardly, produces paralysis; and one or two grains are sufficient to kill the largest animal. Another of Professor Geiger's late discoveries is the active principle of henbane, *(atropin;)* its base is likewise an organic salt, but it is tenacious, admits of being reduced to a crystal, forms a crystalline salt with acids, like hemlock, and has a disagreeable smell, though it is not volatile, unless it be subjected to decomposition. Its poison is quite as deadly as that of the former, but exhibits dissimilar appearances, and is not so rapid in its effects. Animals, where even a minute dose is administered, become languid, cannot stand upon their legs, are attacked by convulsions, and die within six hours. The effect of this poison in dilating the pupil of the eye, is extremely remarkable. The minutest portion of it, when applied to the eye of a cat, produces a dilatation of the pupil for the next four and twenty hours; and the hundredth part of a grain prolongs the appearance for the next seven or eight days, besides inducing other singular symptoms of poisoning.—*Rep. Pat. Invent. March,* 1833.

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17. *Constituents of Opium.*—M. Pelletier in an elaborate memoir on opium printed in the *Annales de Chimie,* mentions the following principles as contained

in opium; viz. narcotine, morphia, meconic acid, meconine, narceine, caoutchouc, gum, bassorine, lignin, resin, brown acid and extractive matter, fixed oil, and a volatile but non-oleaginous principle, which rises in distillation with water.

Added to these substances, M. Bebert announces, (*Journal de Pharmacie*, April, 1832,) another peculiar principle; it is bitter, crystallizable, forms salts with acids, especially with acetic acid, with which it gives crystals in the form of very white scales, and with sulphuric acid white silky crystals;—no name is given to this substance by its discoverer.

M. Robiquet, it also appears, has separated a new alkali from opium, which he calls *paverin*. Only a few details of its properties are as yet given, (*Journ. de Pharm.* Nov. 1882. It differs very remarkably from other vegeto-alkalies in being soluble in water. It saturates acids, is insoluble in potash, and contains much azote; it is very poisonous, and acts very particularly on the spinal marrow.—*Ibid.*

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18. *Hydrosulphuret of Ammonia.*—It is stated by Mr. Newton in the 2d Vol. of the *Dublin Journal of Medical and Chemical Science*, that he and Dr. Marsh had found the hydrosulphuret of ammonia to possess a powerful effect in lessening the pulse. Dr. Graves has been led from this representation to try the remedy in several cases, some of hypertrophy, with increased action of the heart, in others the heart's action was natural. The remedy was increased to twenty-five or thirty drops four times a day largely diluted. But he says that "in no one instance did it exert the slightest effect upon the heart's action on the pulse."—*Dub. Journ.*

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19. *Influence of Vinegar in Lessening the Urinary Secretion.*—Mr. John Dalton in a course of experiments for comparing the quantity of food taken, with that of the different secretions, found on one day a great defalcation in the amount of urine which he passed, and for which he could discover no cause, unless his having taken at dinner time a tea-spoonful or two of vinegar, could account for it. To be satisfied of this, he took some days after, an ounce of vinegar in four equal portions during one day; and the effect was a very great diminution of urine on that day, amounting to fifteen ounces less than the average quantity, (48½ oz.) Mr. D. says that there did not appear to be any increased effect in any other secretion, as a compensation for this diminution.—*Memoirs of the Lit. and Philosophical Society of Manchester, Vol. V. N. S.* 1831.

PRACTICE OF MEDICINE.

20. *Cold Dash in Convulsions of Infants.*—The application of a small stream of ice-cold water to the head, is recommended by Richter in his *Specielle Therapie*, as very successful both in the convulsions and coma of hydrocephalus. This practice is also pursued by Dr. Heim, of Berlin, and repeated so long as the fits of insensibility continues. The neck and shoulders ought to be covered with oiled silk, and the body kept warm. Dr. Graves, of Dublin, recommends a similar practice.—*Dub. Journ.*

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21. *Cases of Obstinate Constipation successfully treated.*—By J. Pidduck, M. D. *Case I.*—S. B. a female, age thirty-five, of the highly nervous temperament, who had suffered severely from spinal irritation, stated that her bowels had been confined for five days; that she had taken aloetic pills, senna and salts, and castor oil, without effect; and that she experienced a sense of fulness in the abdomen, with pain and tenderness, increased by pressure at the sigmoid flexure of the colon. Finding that active purgatives of every kind, whether saline or drastic, not only failed to operate, but aggravated the pain and tenderness; that

enemata, even to the amount of two quarts, returned without effect; and that opiates and antispasmodics only occasioned confusion of head, it was determined to desist from purgatives; to counteract inflammatory tendency by small general blood-lettings, and by leeches, poultices, and epithegms of flannel wrung out of hot water, to the abdomen. Drachm doses of castor oil in mucilage, to promote a constant, but gentle peristaltic action of the intestines, were administered, every four hours; a slop diet was enjoined, a tea-cupful only at a time; and perfect rest in bed. On the *sixteenth day*, an evacuation was procured, preceded by the sensation of something having given way in the bowels; after which they resumed their regular action, and the patient recovered without any untoward symptom. She has for nearly five years enjoyed freedom from a similar attack.

Case II.—E. P. a female, aged twenty-three, subject to pain and tenderness along the spinal column, had suffered inconvenience from an irregular state of bowels. Evacuations were rarely procured without aperients, before obstinate constipation took place. She complained of pain and tenderness at the splenic flexure of the colon. The same expectant mode of treatment, guarding against inflammation, was pursued; and *on the tenth day*, a large, hard, dark-coloured stool was passed, after which convalescence proceeded without any untoward symptom; and the bowels, for a year and a half, have acted with greater regularity than formerly.

Case III.—C. L. a female, aged twenty-three, has suffered from spinal irritation, from obscure enlargement of the abdomen, and difficulty of bowels: at length, total obstruction ensued. Purgatives of every kind not only failed to operate, but occasioned pain in the abdomen, chiefly in the region of the sigmoid flexure of the colon. A moderate bleeding was practised, leeches were applied to the seat of irritation in the spine, and leeches and fomentations to the seat of pain in the abdomen. Under a similar plan of treatment to the preceding, at the expiration of *twenty-one days*, a copious evacuation of several pounds weight took place from the bowels.

The *pathological* principle which these cases illustrate is this:—that when spinal irritation exists, (indicated by firm pressure, percussion, or by the application of a sponge squeezed out of boiling water, occasioning pain in some part of the spinal column,) spasmodic contraction of the muscular fibres of the intestines, and consequent constipation may ensue; that the removal of this irritation, by means of leeches and blisters to the spine, is not alone sufficient to produce relaxation of the spasm, but that the dilatation of the contraction requires the slow and graduated pressure of the contents of the bowels, on the same principle as the bougie for the relief of stricture.

The *practical* fact is this:—that constipation of the bowels, unattended by any pathognomonic symptoms, is by no means dangerous; that the danger to be apprehended and guarded against is from inflammation, or from an attack of ileus; that the danger is augmented by the administration of active aperients, as evidenced by the increase of pain and tenderness, requiring vascular depletion, which purgatives occasioned, partly by stimulating the mucous surface of the intestine, and partly by forcing the contents too violently against the stricture.

But, by subduing the inflammatory tendency as it arose; by promoting the regular, but moderate peristaltic action, of the bowel; by a slop diet, and that only in small quantity; by rest, and the uniform temperature of the bed, at length the stricture yielded, admitting of a free passage; whereas, under the heroic plan of treatment, increasing the strength and frequency of the purgative doses for the purpose of overcoming the resistance, *vi et armis*, a fatal termination of these cases might have been the result.—*Lond. Med. Gaz. Dec. 15th*, 1832.

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22. *Treatment of Boils.*—Professor Graves has found a combination of tonics and alkalies the most effectual remedy in cases of repeated crops of boils which occur in broken constitutions, and running through a process of imperfect sup-

puration, producing much irritation, loss of rest, and hectic symptoms.—*Lond. Med. and Surg. Journ. Dec. 15th*, 1832.

23. *Neuralgia.*—MM. Trousseau and Rullier recommend the cyanuret of potass, (gr. iv. to ℥j. of water,) as a local application in tic douloureux and neuralgia.—*Ibid.*

24. *Paralysis from Painter's Colic, affecting the Upper Extremities.*—In cases of this description, Dr. Bright recommends cupping and blistering the nape of the neck. Dr. Graves has found, in one case, much benefit from this treatment.—*Ibid.*

25. *Enlarged Spleen.*—Dr. Percival has derived much benefit in enlarged spleen from a combination of gentian and iron.—*Ibid.*

SURGERY.

26. *On the Excision of Hæmorrhoidal Tumours.*—In our last No. p. 513, we gave an extract from a clinical lecture of Baron Dupuytren's on this subject. In a subsequent lecture the Baron offered some interesting remarks on the consequences of the excision of hæmorrhoidal tumours. These remarks are so important that notwithstanding their length we give them in full We take them from the report in our cotemporary, the *London Medical and Surgical Journal.*

Dr. Marx has inquired of me, observed M. Dupuytren, if we should not *always, and in every case, cauterize immediately after the operation*, rather than run the chance of internal hæmorrhage, which presents the serious dangers we have already explained. I agree with him, for it results from the recapitulation of a great number of hæmorrhoidal extirpations, which I have performed at the hospital, as well as in the city, that this consecutive internal hæmorrhage came on unexpectedly in two fifths of the cases of operations which have not been cauterized; never on the contrary, has it taken place in cases where the cautery has been used. The question then to be decided is, are not the inconveniences of cauterization preferable to the dangers to which the patient is exposed from hæmorrhage? Now it may be remarked to me, that no comparison can be made between them, that the inflammation and tumefaction which occur after cauterization, the irritation which extends to the rectum and urinary organs, generally yield to the simple treatment which I have before pointed out, and have never been followed by fatal effects; while on the contrary, internal hæmorrhage puts the patient's life into the most imminent danger. Let us suppose a case where some circumstance would not permit assistance to be given in time to the patient attacked by internal hæmorrhage, he will perish, and the operator will feel the greatest regret for not having prevented this accident by using cauterization. Finally, it may be said to me, that since this hæmorrhage occurs in a great majority of cases, and that it is impossible to know *a priori*, if the patient that is to be operated on may be one of the few who escape this accident, why not admit it as a principle that cauterization should always be used. I acknowledge that these considerations appeared to me to be just, and they will lead us without doubt to modify the treatment which we have used to this day in these cases. A treatment as certain in stopping hæmorrhage. is the introduction of a pig's bladder stuffed with charpie into the anus. Though it succeeded in the first operation of this kind that I performed, says M. Dupuytren, I perceived that it was very annoying to the patient, and that it was almost always expelled involuntarily by spontaneous efforts, which were induced by its presence. The other consequences of the excision of hæmorrhoidal tumours are much less dangerous and less unpleasant. There frequently appears a considerable tumefaction of the cellular and adipose tissue of the anus; the principal inconvenience

attending this tumefaction is the severe irritation of the rectum, in consequence of which the patient, during four or five days after the operation, feels it quite impossible to go to stool: but the aperient and the enema being again administered, strict regimen being observed, this want will be very much moderated, and will remove a constipation of some days, which would be otherwise annoying. This tumefaction may also cause a retention of urine, but we possess most efficacious means of removing this; as for the tumefaction, it yields quickly to the application of leeches, emollient fomentations, baths, &c. The pain attendant on excision is intense, but almost instantaneous, and this annoyance, which is inseparable from the slightest operation, should not be weighed against the pain and danger caused by the disease. After the operation the patient is liable to different affections, which ought to be the special objects of the surgeon's attention, and which it is in his power to prevent.

It must be acknowledged that persons affected with disorganized hæmorrhoids, are reduced to a state of profound anemia, to asthenia, brought on by the abundance and frequency of hæmorrhages or sero-purulent discharges. These evacuations, to which the patient has for a long period been subject, cannot be suddenly stopped without causing a reäction in the whole system; a general state of *artificial* plethora is induced, sanguine congestions take place in the lungs, liver, and brain, and affections of these organs may follow. The patient is often seized with syncope, spasms, giddiness, and falls into a state of alarming insensibility; the arteries pulsate with such violence that one would think that there was aneurismal diathesis, if these anormal pulsations were not changing every instant their seat and form; and it is a remarkable fact, that this plethora coïncides with a pale complexion, the skin generally yellow, or earthy coloured, especially the face, and with great weakness. Repeated bleeding for some time, and at short intervals, if the patient is young, vigorous and robust; and if the discharge from the anus has been sanguine, the introduction of a seton and of a cautery, if the discharges were of a purulent nature; these two remedies combined, if the case require them, gentle laxatives frequently administered. These are the most approved remedies, and this is the most rational prophylactic treatmen: we can make use of to prevent a plethora, the existence of which would lead to the most serious danger. When the excision of the external tumour is performed, the cicatrix which remains, either from constriction of the sphincter, or from the tension of the teguments and of the anus, is sufficient in the greater number of cases to oppose efficiently the protrusion of the internal tumour, and we can then dispense with having recourse to the excision of the latter. Beside, the second excision, like that of the external tumour, is generally without injury, and the patient is completely cured of the disease. Excision may sometimes be followed by contraction of the anus. J. L. Petit has reported a case where the contraction was such, that the pipe of a syringe could scarcely be introduced; and this accident can be prevented by introducing into the intestines large wicks, and by renewing them until the cure is perfect. Let us now apply the directions given by M. Dupuytren, his particular practice, and that of his hospital will furnish us with a number of cases. 1st observation.—A shoemaker, about thirty years of age, came some time since for advice for hæmorrhoidal tumours, which weakened him very much; his trade obliged him to sit continually bent; but he attributed his disease to a visit he made in Champagne, where he indulged in numerous excesses in the wine of that province. It was at that time in fact he first perceived that tumours had formed at the verge of the anus. They were at first small, very slightly painful, and only protruded when the patient went to stool; they afterwards increased considerably in size. These tumours, as in many other cases, presented two stages, one which may be called inert, during which time the hæmorrhoids did not discharge, or the discharge was a slight serous oozing, without any inflammatory symptoms; the other stage, designated hæmorrhoidal crisis, is perceived by swelling inflammation, severe darting pains, a considerable discharge of blood, afterward of sanguineous serosity. These crises returned more frequently, their

duration increased, the sufferings of the patient became more violent, and his health suffered great injury. When he came to the hospital he was weak, emaciated and yellow; he walked quite bent, and could not straighten himself. This position resulted from a considerable protrusion of the hæmorrhoids, which was at least as large as the fist of a child of seven or eight years old, and was composed of two tumours, one internal, the other external. The patient was besides affected with obstinate constipation, which is often the consequence of an irritation, which extends itself to the rectum, and of a retention of urine, a complication not less common than the preceding. M. Dupuytren recommended the administration of enemas, and the use of baths; by these means the retention of the urine was removed, but the fæcal matter remained. The swelling of the hæmorrhoids was much diminished, there was less redness, the patient suffered much less. There is no doubt that leeches, emollient fomentations, baths, enemas, rest, and proper drink, will not cure the actual crisis, but it is evident that such treatment will palliate it, and that accidents will reproduce this affection at an epoch more or less distant, according to the hygienic state of the patient.

We may be asked perhaps what inconvenience would result from the use of this palliative treatment at each return of the crisis? It is the treatment adopted by many physicians; it is also preferred by many patients who dread the operation. It sometimes happens that this temporary relief retards the return of the crises, and renders them more unusual; but more frequently they reäppear, and the health of the patient visibly alters.

This motive, however allowable it may be, should not be put in comparison to the dreadful effects which the continuance of the disease would bring on; the tumours, external as well as internal, often become scirrhous; sometimes the latter, on its development, recedes up the rectum, to a height which we cannot attain, and the disorganization extends itself in the inside of the intestines. If to these disagreeable consequences you add the general state of the patient, who presents a severe affection of the system, you will think with me, says M. Dupuytren, that it is necessary to practise excision in the actual crisis. But again, do not think that in giving this opinion, I mean that the extirpation of the hæmorrhoids should always be practised; I have pointed out before in what circumstances they should be left to nature, and when they should be removed by cutting instruments. After these preliminary considerations, M. Dupuytren directed that the patient should be brought. He lay on the bed on his knees and elbows, his thighs separated, and with the scissors before mentioned, the professor excised the hæmorrhoidal tumours; after the excision the wound was not cauterized. Cauterization, though certain in its results, has something appalling to the spectators. I have seen you shudder more than once at the sight of the red iron, and at the cloud of smoke which rises from the cauterized part; you may judge what an impression such a preparation would produce on the friends and relations of the patient, who are not, like you, accustomed to such scenes.

Meanwhile, fearing that the hæmorrhage would supervene, we recommended to the surgeon of the ward to watch the patient with the greatest care, and to apply the cautery if the blood began to flow in the rectum. It was also to avoid this disastrous occurrence, that we make it a rule not to apply the dressings for some hours after the operation, because it is to be feared that the dressings would only hinder the blood from flowing out, and thus cause it to flow back into the superior intestines.

What we apprehended, continued M. Dupuytren, happened the next day, an internal hæmorrhage manifested itself; the pupil of the ward was not mistaken, from the symptoms we had so plainly pointed out; he had recourse to the means that have always succeeded with us. He gave him an enema, which brought away a great quantity of blood, a second enema brought a considerable clot; he then made the patient strain, first to expel any blood that might remain, and secondly, to cause relaxation of the sphincter, and exhibit the surface of the di-

vided arteries; then he applied to the bleeding parts two red hot iron instruments. The hæmorrhage did not reäppear, and from this period the patient no longer experienced colic pains, nor syncope.

The quantity of blood lost in this operation has been estimated to be three, four, and five pounds. It flows into the descending colon, also the transverse and ascending, and as far as the cœcum, but never beyond this. The patient, whose case we are describing, presented a complete assemblage of the symptoms of the disease, and the consequences of the operation. From the effects of cauterization he experienced a retention of urine, when it was necessary to use the catheter; after the evacuation of a great quantity of urine, he felt violent pain, which did not cease until the organ returned to its usual state. But the inflammation and swelling caused by cauterization are already diminished, the patient is going on well, and in about fifteen days he will be cured.

Finally, we know that persons affected with hæmorrhoids are subject to obstinate constipation; in this case it lasted for several days; excision as it often happens, had increased it. We have already remarked, that we should not induce stool until the inflammation and swelling have decreased or even disappeared; because before that time, the fæcal matter cannot be expelled without causing violent pain, augmenting the irritation, and tearing the parts. It was not until after this time that enemas and gentle aperients were administered. The sixth day after the operation, all these accidents were dissipated, he went with ease to stool, he had no pain, and wished to be discharged.

Second observation.—About fifteen years ago, a very wealthy banker, about forty-five years of age, of a bilious temperament, consulted the Baron Dupuytren for hæmorrhoids that were constantly in a state of hæmorrhage. These sanguineous discharges had reduced him to a state of great debility and anemia. Pale and debilitated, he visibly emaciated; he was unable to attend in his counting-house; to write a letter was very fatiguing, and almost impossible to him. M. Dupuytren, after examining him, recognised the existence of internal hæmorrhoids, and proposed excision, which was quickly agreed to. Some days after he proceeded in the following manner:—The patient having taken an enema and a hip bath, lay on the edge of the bed, the thighs separated; violent strainings protruded the hæmorrhoids, which were immediatey seized with a forceps with large blades and excised, not without much trouble; no external hæmorrhage manifested itself. M. Dupuytren did not leave the patient; at the end of a quarter of an hour he perceived him become pale, fall into a state of weakness more and more decided, the pulse became small and hard, a cold perspiration covered his body, he felt a sensation of heat in the abdomen, which was continually ascending. From these signs the professor could not doubt that internal hæmorrhage had ensued. He immediately recommended the patient to make expulsatory efforts, and a great quantity of scarcely coagulated blood was discharged; cold injections were useless, the hæmorrhage was not stopped: then a pig's bladder stuffed with *charpie* was introduced; this succeeded completely, but it was not without great difficulty that it could be kept in its place, involuntary expulsatory efforts tended incessantly to displace it, and actually did so several times. This hæmorrhage weakened the patient very much, and would undoubtedly have been fatal if it had not been arrested so promptly; in a short time the cure of the patient was completed.

Third observation.—The banker, whose case we have just considered, had a brother at Berlin, who had almost the same symptoms; this person heard of his brother's cure, and wrote to M. Dupuytren. After the report of a celebrated surgeon of Berlin who attended him, M. Dupuytren was quite convinced of the existence of similar internal hæmorrhoids, and recommended excision. But the accident that happened to the first brother had suggested to him a means of effectually stopping the hæmorrhage, and, consequently, obviating the greatest danger attendant on this operation. He gave written directions, and advised cauterization, with a *cauterie en haricot* if the hæmorrhage manifested itself. The surgeon at Berlin did not follow these directions; immediately after the

operation he quitted the patient. Not long after his departure, symptoms of internal hæmorrhage presented themselves; the patient became faint, pale and covered with cold perspiration. One of his younger brothers, who had been present at the first operation, discovered the cause of the malady, and sent after the surgeon immediately, without being able to find him; time was lost, and the danger was imminent; this young brother had the presence of mind to introduce the bladder, as he had seen it done, into the anus, and stuff it with lint and succeeded in stopping the hæmorrhage, but the loss of blood was so great that the patient was a long time before he recovered.

Fourth observation.—A broker, the father of a numerous family, suffered for some years from internal and external hæmorrhoids, by which he was more and more incommoded; he was in such a state as to be unable to walk more than sixty paces without stopping to lean against a stone stud, to gain a momentary relief from his sufferings. Finding that he was obliged to give up his business, and wishing at any price to preserve the power of providing for the wants of his children, he came to M. Dupuytren, who examined him, and perceived a double hæmorrhoidal tumour, being in every way two inches and a half in diameter; blood and pus were discharged frequently, and the scirrhous disorganization appeared very great. M. Dupuytren proposed excision to him. Some fatal cases which recently happened under other surgeons, having made great noise, and this man having heard of them, the proposal made him shudder. M. Dupuytren had great trouble to convince him that cauterization of the vessels was sufficient to obviate all fatal consequences. At length the patient consented to allow the operation; but he wished to go to the Hôtel-Dieu, as he would be better watched, and in order that at the first appearance the hæmorrhage might be combated. The excision was made, some of the vessels were cauterized, and on the twelfth day the patient was perfectly cured.

Fifth observation.—M. Ex—— a Scotchman, a cavalry officer in the service of the King of England, unmarried, about forty years of age, of a sanguine temperament, experienced, for more than three years, great sufferings, caused by internal hæmorrhoidal tumours, which protruded on the least attempt to go to stool. As the fatigues of his profession considerably augmented the annoyance, he came to Paris to consult M. Dupuytren. In compliance with his advice went into a *Maison de Santé*, where he was operated on by this celebrated surgeon, in the following manner:—The patient lay on his side, and made efforts as if at stool; the upper thigh was raised up by an assistant: the operator seized each tumour with a large indented forceps, and with a very sharp bent scissors, excised them successively. There were three tumours, not very voluminous, and as there was but a trifling effusion of blood, M. Dupuytren thought that cauterization might be dispensed with. An assistant was charged to remain with the patient, who was perfectly calm. About five hours after the excision; all the characteristic symptoms of hæmorrhage in the rectum were manifested; anxiety, rigors, inclination to vomit, cold perspiration, sinking of the pulse, convulsive contraction of the limbs, inexplicable agony, vertigo, syncope; tenesmus increasing the patient went to stool, and the expulsion of a considerable quantity of partly coagulated blood gave him visible relief. A cold enema was administered, as M. Dupuytren had directed in such cases; it was returned immediately, and replaced by another that was longer retained. Nevertheless, at the expiration of about an hour, the symptoms returned with increased intensity; they produced complete collapse. The patient requested a notary would be sent for, and hastened to arrange his affairs, preferring death, which he thought was inevitable, rather than submit to cauterization. Dr. Caillard and Dr. Marx took the responsibility on themselves; they endeavoured to tranquillize him; and it may readily be imagined that it was not easy to cauterize under these circumstances. With the aid of a *speculum*, the place from whence the blood flowed was easily found, and the effusion stopped by the application of a bent *cauterie en haricot*, heated to a white heat. The hæmorrhage ceased; the alarming symptoms were dissipated; the inflammation which results from the caute-

rization, and the dysuria that usually accompanies it, yielded very soon to the use of cataplasms, enemata and baths; a wick was kept in the rectum, and at the end of a few days the patient was perfectly cured.

Sixth observation.—Mr. Joseph Cur— of Polish origin, a singer at Amsterdam, forty-eight years of age, for several years suffered great pain in expelling the fæcal matter. This difficulty was caused by the presence of internal hæmorrhoids, which all together were about the size of a hen's egg. During the act of defecation they protruded, and caused a very painful strangulation, which was very difficult to reduce.

These tumours were not accompanied by habitual nor periodical discharges, only when the patient had a constipation; the hardened excrements, occasioned by their pressure, an erosion that gave rise to a slight discharge of blood. Forced by his profession to long standing, and to exertions of the voice that augmented his disease, and his sufferings, he resolved to travel to Paris, in hopes of being cured. M. Dupuytren made him go into a *Maison de Santé*, where, two days after, he was operated on. The patient lay in a convenient posture; the tumours, three in number, being protruded, were immediately excised. What is remarkable in this case, is, that notwithstanding the large volume of the tumours, the excision caused but a slight effusion of blood, and did not require the cautery. A year after his cure we had occasion to see this patient, when there was no failure in the success obtained with an astonishing promptitude. These observations we owe to the complaisance of Dr. Marx; we will, in conclusion, add one communicated by our benevolent colleague, Dr. Paillard.

Seventh observation.—A man, about forty-seven years of age, of low stature and sanguine temperament, came to the Hôtel-Dieu, to be treated for internal and external hæmorrhoids, with which he had been afflicted for fifteen years. These tumours were so painful that he could take very little exercise, or run for any distance, without causing protrusion of the internal hæmorrhoids, which became irritated immediately by the friction of the dress. Repeated inflammation caused a discharged, sometimes sanguine, sometimes purulent, sometimes both one and the other. The act of defecation was a continual torture to the unhappy patient. Should the fear of those accidents that may result from the excision induce us to leave the patient a prey to this disastrous infirmity? The frequent returns of inflammation of the hæmorrhoidal tubercles will bring on disorganization. Besides, it is almost certain that the sanguine and purulent discharges would undermine the patient's constitution, and the sufferings he would undergo would hasten this fatal termination. We did not hesitate; the operation was decided on, for the danger was not inevitable, whilst disorganization would produce certain death. The patient was prepared for the operation by every means likely to insure success. General bleeding was practised, in order to prevent the violence of the inflammation which usually follows the excision of hæmorrhoids. A blister was applied to the arm, to prevent the danger which sometimes follows the too sudden suppression of a natural discharge. The patient was kept on low diet, and the day before the operation the intestinal canal was emptied by an aperient. A tumour, composed of seven or eight tubercles, brownish on the outside, but of a brighter colour inside, encircled externally the verge of the rectum. When the patient was lying down, without making any effort, all the tubercles were grouped, so as to form a brownish rugged tumour, about the size of a large walnut. When, on the contrary, the patient contracted the abdominal muscles, or strained as if at stool, the external tumour opened and exposed a second circular hæmorrhoid, also composed of seven or eight tubercles, but of a different colour, for they were uniformly of a roseate colour, and covered in all their extent by the internal membrane of the rectum. After having pointed out these different circumstances, M. Dupuytren ordered the patient to lie down on his abdomen, and to make efforts as if at stool. This caused the protrusion of the internal hæmorrhoids, which were seized with a dissecting forceps, and each of the tubercles that composed it were excised. The same was done with the external tumour, and immediately

after a cautery, heated to a white heat, was applied to the bleeding parts of the wound; some hours after a small wick was introduced into the anus, and afterwards a cerate. He could retain them but a very short time. During the day he complained of transient colic pains, (diet, diluting drink, &c.) The nex day the colic pains were more violent and more prolonged, the verge of th anus was tumefied and painful, the patient felt difficulty in voiding urine, fever ish symptoms, (bled in the arm, diluting drink, &c.) The third, fourth, fifth and sixth days after the operation, the pains decreased, the urine was freely evacuated, and the feverish symptoms disappeared; the appetite returned, and he was allowed some aliments. The seventh day, as the patient had not been at stool from the day of the operation, an ounce of castor oil was administered to him, and some hours after the bowels were opened five or six stools occurred during the day, they were all accompanied by great pain at the anus, nevertheless, after each of them, the patient felt considerable relief. The following day he went freely and naturally to stool, the colic pains became less and less frequent, but the twelfth day they returned with violence, and were followed by diarrhœa, the cause of which was unknown, (mucilaginous drinks, &c.) The next day he was in the same state, (treacle one ounce.) The fourteenth day the diarrhœa ceased, and with it the colic pains, (rice gruel.) On the fifteenth day the patient was quite well. He was allowed a moderate portion of food, he was radically cured of the hæmorrhoids, and the anus remained free in whatever posture he placed himself; defecation caused no pain, and he quitted the hospital completely cured.

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27. *Prognosis and Treatment of Luxations of the Cervical Vertebræ.*—Dr. Seifert relates in the *Journal Complémentaire des Sciences Medicales*, two cases of unilateral luxation of the cervical vertebræ, in which reduction was successfully and readily effected. The three principal symptoms of this luxation are stated by Dr. S. to be the impossibility of the patient's turning over his head to the side opposite to that of the luxation, the inclination of the head to the side where the luxation has occurred, and the position of the spinous apophyses of the luxated vertebra beyond the normal line of the spinous apophyses. That this luxation by itself is not dangerous, is proved by anatomy and experience. The efforts of the surgeon for its reduction are not to be so much feared as has been believed. The elongation of the spinal column by extension and counter-extension, cannot injure to any extent the spinal marrow, this elongation being participated in by all the articulations, and consequently it is very little for each one of them. In practice the increase of the inclination of the head in the direction of the luxation may be avoided.

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28. *Case of Luxation of the Lower End of the Ulna, with Remarks.*—An officer, aged thirty-two, of athletic form, was thrown from his horse, and his right arm got entangled and confined between the horse's head and the ground in such a manner as to receive a violent shock. He experienced acute pain, and imagined that his arm was broken. It proved, however, to be a dislocation at the wrist, and attempts were made by two surgeons to effect reduction, but without success; and he repaired to Paris to consult M. Dupuytren. When seen by this distinguished surgeon, which was thirty-four hours after the injury, the symptoms were as follows:—The forearm was swollen; the hand in a position intermediate between pronation and supination; the inferior part of the forearm was rounded, and consequently lessened in its larger diameter; an unusual projection raised the skin at the middle and anterior part of the wrist; on the inner side the internal maleolus could not be felt; behind, a hollow occupied the situation of bulging usually produced by the head of the cubitus; if this bone was traced with the fingers from the elbow to the hand, it would be perceived that it was directed obliquely forwards and outwards, crossing and passing above the lower part of the radius. The dislocation of the ulna forwards was therefore evident.

The radius had remained in its place, and the hand followed this bone as in the natural state. The wrist neither projected forwards nor backwards. In making some movements, M. Dupuytren believed that he perceived an unnatural degree of mobility at the lower end of the radius, but without being absolutely certain of its existence; no crepitation could be detected; pronation and supination were completely destroyed; and, finally, two bruises were seen, one corresponding to the lower third and inner side of the ulna, the other on the outer surface, and at the union of the radius with the hand.

These points having been distinctly ascertained, M. Dupuytren proceeded to the reduction. The patient was seated at an angle of the wall, where there is fixed a ring, used for such operations; a sheet, which was passed under the right axilla, and through the ring, afforded a fixed point of counter-extension; another sheet was applied at the bend of the elbow, and given to the assistants in such manner that the forearm remained bent at a right angle on the arm; a napkin was attached to the wrist, and three assistants made extension. The reduction, however, was not thus accomplished. Perceiving the inutility of this mode of extension, it struck M. Dupuytren to extend the limb himself by the hand, inclining it strongly towards the radial side, whilst with his two thumbs united, he endeavoured to force the ulna inwards and backwards. By this means the reduction was accomplished. A slight noise was heard as the bone slid into its place, and the patient exclaimed, "I am cured." All the deformity had disappeared; the movements of pronation and supination were performed with freedom; the apparatus for fracture of the forearm was applied to guard against injury, and the patient sent to bed. He slept well the following night, and next morning the swelling had begun to decline. The bandages were readjusted; and in the course of the day the patient returned home.

M. Dupuytren says that he has met with but one analogous case. "A builder, raising his hand to protect himself from a portion of wall which was falling upon him, had the wrist-joint dislocated, and came to the Hôtel-Dieu with all the symptoms of a luxation of the ulna forwards—such as we have seen in this patient. The reduction was accomplished in the same manner, and proved equally successful. Thus, reckoning that which is before you, here are the only two cases of the kind which I can call to mind as having occurred during the twenty-four years that I have been surgeon to this hospital. It is of importance that they should not be lost, for in surgery it is, especially with respect to dislocations, that precise details are wanting. If every author, in treating of this subject, had thought fit to speak of what he had seen, instead of copying the descriptions of others, we should ere now have had a multitude of accurate cases, which have been lost from negligence, while we should have been spared many of our present inexact and erroneous notions.

"The skin, you perceived, was not torn. In the luxation of the ulna forwards, this, indeed, must be very rare, for it would require enormous violence to effect it; it would, in fact, be necessary that the radius should have been fractured severely, if indeed it were not comminuted, and the strength of the ligaments and the thickness of the fleshy parts, and even of the integuments in front, would present an impediment to external projection of the bone, which it would be very difficult to overcome. It is different with the luxations backwards—there the ligaments are not so strong; the bones are almost immediately covered by the integument, while the sharp projection of the styloid process forms a ready means of tearing through the parts. Have you not observed, after certain wounds from fire-arms implicating this joint, or its immediate neighbourhood, how, when chronic inflammation supervenes, the thin delicate skin about the outer and back part of the wrist becomes ulcerated? I have seen it perhaps twenty times; and it depends upon the projection of the styloid apophysis.

"I have referred to the observations of Sir A. Cooper, and to those of M. Breschet; and I have looked into all the cases I have, and can only find two which are analogous. Now then comes this question: suppose there were dislocation with rupture of the integuments and protrusion of the bone—what

should be done? Ought we to attempt reduction, or to cut off the projecting part, or to amputate? I would prefer immediate and exact reduction—making free incisions; for the chief danger lies on the side of inflammation and strangulation of the parts beneath the aponeuroses. I would not cut off the projecting bone unless the necessity for doing so were conspicuous; still less would I have recourse to amputation.—*Lond. Med. Gaz. Dec. 15th*, 1832.

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29. *Case of Subclavian Aneurism.*—The *Lancet*, for November last, contains an account of a case of subclavian aneurism successfully treated by William P. Nichols, Esq. of Norwich. The subject of the case was a lady, twenty-one years of age, in whose neck a pulsating tumour appeared immediately after she had subjected her left arm to severe and unusual exertion in saving herself from a fall.

"On examination," says Mr. N. "I found a tumour of the size of a hen's egg, situated in the left side, occupying the triangular space which is bounded below by the clavicle, on the inner side by the clavicular portion of the mastoid muscle, and on the outer side by the anterior fibres of the trapezius, evidently the result of some injury done to the subclavian artery in that part of the canal which stretches from the edge of the scalenus muscle towards the axilla, before it has passed under the clavicle; indeed, so near the edge of the scalenus was the injury, that I was not able to compress the vessel with my thumb, between the muscle and the tumour.

"The aneurismal nature of the swelling being very evident, I did not think it desirable at that time to apprise the patient of the formidable character of the tumour; but, directing her to remain quiet, I gave her some aperient medicine, promising to see her again in a few days, when I explained to her fully her situation, and the mode of treatment which I proposed to adopt; she assented, and the operation of securing the vessel above the aneurism was performed in the following manner:—

"*April 30th, eleven A. M.*—The patient was placed in an horizontal position on a table about three feet in height, having her head hanging over the end, and supported by an assistant. The integuments being drawn down, an incision was then made through the skin and platysma myoides, along the clavicle, three inches in length, from the outer fibres of the clavicular portion of the sterno-cleido-mastoideus, outwards: another incision was carried from the inner point of the former one, upwards along the clavicular portion of the sterno-cleido-mastoideus for four inches; this incision passed between the fasciculi of the platysma myoides, which, in this case, were remarkably large. The triangular flap formed by the two incisions, was dissected back, carrying with it, imbedded in its substance, the external jugular vein, as far as the tumour would allow of its being done; and a little dissection now brought into view the omo-hyoideus at the upper part, passing obliquely upwards to its insertion. This muscle was divided, and a small artery passing across the wound immediately below it, was secured; the deep fascia of the neck was here exposed, having on the inner side the middle scalenus beautifully distinct, and passing to its insertion into the tubercle of the rib. By slightly rotating the head, the different direction of its fibres from those of the sterno-cleido-mastoideus, became remarkably apparent, showing how important at this stage of the operation it is, that this muscle should be your guide. The fascia was then cautiously divided along the outer edge of the scalenus, and the transverse artery of the neck drawn upwards by a blunt hook, whilst the large vein which accompanies it, but which crosses the wound considerably lower down, was secured by two silk ligatures and divided. This enabled me to pass my finger along the scalenus to the tubercle of the rib, and to compress the artery where it leaves the chest, about half an inch above that process. The space, however, between the aneurismal tumour and the scalenus was so small, that it was thought adviseable to divide a few of its fibres, in order the more readily and securely to tie the vessel. This having been done, a strong blunt aneurismal needle armed with a silk li-

gature was very readily passed under the artery from below, and its blunt extremity having been pressed upwards, I cut through the cellular tissue upon it, and thus passed the instrument without detaching the vessel from its connexions. The ligature was tied with great ease, and the tumour immediately subsided. All pulsation ceased from that time; the edges of the wound were brought together by means of a suture and some adhesive plaster, and the patient returned to her bed. She bore the operation with remarkable firmness throughout."

Nothing requiring notice subsequently occurred. The ligature on the artery came away on the 20th of May, and up to the date of the report, (November,) the patient had enjoyed perfectly good health, and felt no inconvenience from the operation.

The following circumstances Mr. N. considers of some importance:—

"*The position of the patient*, who was placed horizontally, with the head, (as described,) hanging over the end of the table, which position contributed very materially to facilitate the different steps of the operation. The space is thus completely exposed; the light falls fully on the part where it is of the most importance; and the operator is not confused by the presence of any accumulation of blood at the bottom of the wound.

"*The turning back of the jugular vein imbedded in the flap*, thus placing it beyond the chance of injury at the time of, or subsequently to, the operation.

"The practicability of performing this operation *without detaching the sterno-cleido-mastoid muscle from its clavicular origin*, although the tumour was situated above the clavicle.

"*The drawing upwards of the transverse artery*, and thus leaving it undivided, by which this vessel, (becoming enlarged as the circulation in the extremity grows more free,) becomes one of the principal trunks in subsequently supplying blood to the limb.

"*That no unfavourable symptoms* were produced by the division of, and tying, the accompanying vein, which in this instance could not be avoided.

"Lastly, the passing the aneurismal needle under the vessel, *without separating it from its connexions, which may be readily effected; and of tying it beneath the outer fibres of the scalenus*, which fact appears to me valuable, inasmuch as it proves, that the very short distance between the ligature and the thyroid axis, affords sufficient space for the formation of a coagulum, and the consequent obliteration of the arterial tube."

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30. *Clinical Lecture of M. Dupuytren on Retraction of the Fingers.*—M. Dupuytren, several months ago, directed the attention of his pupils to the subject of permanent flexion of the fingers, and the different causes of the deformity. Writers, in general, have only treated of that species of flexion of the fingers which is occasioned by hardened cicatrices from burns on the palm of the hand. M. Boyer, in his work on Surgery, briefly refers to the subject, and attributes the retraction of the fingers to a *crispatura tendinum*. The real causes and proper treatment of such cases were unknown, until M. Dupuytren discovered that the presumed contraction of the tendons was nothing more than contraction of the palmar aponeurosis, the division of which would immediately remove the deformity. At this time there was every reason to believe that this affection of the aponeurosis was accidental; the causes of it appeared evident, inasmuch as it existed usually in persons who were obliged to make frequent and violent efforts with the palm of the hand. Additional facts, however, have shown that this contraction of the aponeurosis may be not only congenital, but also hereditary. In July, M. Dupuytren was consulted in the case of a child, six years of age, who had a permanent retraction of the little and ring fingers. There were no traces of cicatrix or burn; but, when the fingers were forcibly bent backwards, the extended aponeurosis raised the skin like a tight cord, and left no doubt as to the diagnosis. In this instance the deformity was congenital;

the grandmother of the child had also been born with the same deformity. But, independent of retraction of the aponeurosis, and cicatrices upon the palm of the hand, other causes may also give rise to rigid contraction of the fingers, and different modes of treatment may be required. M. Dupuytren, for example, enumerates white swelling upon the joints of the fingers, and their consequent anchylosis; deformity of the articular surfaces from the effect of certain trades; the existence of serous cysts in or near the articulations; wounds of the flexor tendons; and paralysis of the extensor muscles. A case recently occurred at the Hôtel-Dieu from a different cause. The following is a brief account of it.

Retraction of the Middle Finger, in consequence of Adhesions of the Extensor Tendon. Division of the Tendon; Cure.—Virginie Lecord, three years old, had, at the age of a year, several small abscesses upon the lower third of the back part of the forearm. The two cicatrices that remained appeared too large for simple boils; but whatever might have been the nature of the abscesses, there was a cicatrix on the lower part of the forearm, outside the extensor tendon of the fingers, and a second inside the tendon, about half an inch lower down. The tendon formed a projection under the skin like a hard and rigid cord; the hand was bent backwards so as to form an obtuse angle with the back part of the forearm. The fingers were habitually in a flexed position; and it was only for a short time that the child had gained the power of voluntarily extending them. The state of the middle finger was different from that of the others; the first phalanx of it being bent much more backwards than the others; whilst the two other phalanges were rigidly flexed. In producing extension by force, the third phalanx was extended upon the second, but the latter remained obstinately bent upon the first.

M. Dupuytren regarded this as a very remarkable fact: the cause of the flexion existed neither near the joints nor the palm of the hand, but upon the back part of the forearm. There was no difficulty in explaining this apparent anomaly. In consequence of inflammation of the neighbouring parts, there were morbid adhesions and retraction of the extensor tendon, which satisfactorily explains the immoderate extension of the hand and first phalanx. But this forcible extension, this bending of the hand backwards, produced an unusual elongation of the flexor tendons and muscles, which were constantly endeavouring to regain their natural length; hence the habitual flexion of the fingers; but the extension being more powerfully exerted upon the middle finger, and pulling backwards the first phalanx, the action of the flexors, which could only act upon the two other phalanges, bent them inwards with still greater force. Every one may ascertain the validity of this explanation upon his own person. When all the muscles are in a state of repose, the fingers are more or less flexed, and they cannot be extended without bringing the flexor muscles into a greater or less degree of tension. If extension is forcibly produced, the tension of the flexors is augmented, and there is a degree of extension at which the hand cannot be forced further backwards upon the wrist, without flexion of the phalanges occurring in spite of any voluntary efforts to prevent it.

In the above case, the treatment, said M. Dupuytren, was obvious. It was necessary to divide the bridles which held the extensor tendon, and prevented it from yielding to the power of the flexor muscles, and perhaps also to divide the tendon itself. This division was made in the simplest manner; the tendon was exposed and cut across, and a part of the bridle, which was formed of a fibrous elastic tissue, was removed. The hand was immediately restored to a state of moderate extension; the middle finger was bent back, and the parts were maintained in position by an appropriate apparatus.

In fifteen days the little patient was discharged from the hospital entirely cured of the deformity. M. Dupuytren suggested that other causes would be discovered of this affection. It is very possible that the flexor muscles might be attacked with spasm, analogous to that which sometimes affects the sterno-mastoidean, and which necessarily draws down the head, and forcibly raises

one shoulder. Some authors have pointed out a flexion of the finger as a symptom of luxation of the wrist, but M. Dupuytren doubts the existence of this injury.—*Gaz. Med. Tom. III. No.* 101.

31. *Injury of Hip-joint, and Secondary Luxation into the Ischiatic Notch.*—The following rare and interesting case is related by Mr. Ward. A tall but not very muscular shoemaker, aged forty, was admitted into St. Thomas's Hospital September 27th, having received an injury on the hip-joint from a fall. On admission he stated, that while walking on the pavement a month before, he slipped from the curb-stone, and fell with the whole weight of his body on the left hip, which part, he thinks, struck against the edge of the stone. On attempting to rise he again fell, and struck his knee. He was taken to Guy's Hospital and examined, but neither fracture nor dislocation being made out, he was dismissed. On the following morning he was brought to St. Thomas's Hospital. No fracture nor dislocation could be detected; he complained of a good deal of pain in and about the hip-joint, for which he was cupped freely and dismissed. After this he obtained admission into St. George's Workhouse as a pauper, where he was again carefully examined by the parish surgeon, but with the same result. He remained here a month, suffering very severe pain at times; kept his bed, and had the parts fomented frequently. He also states, that the day after the accident he could perceive that the left leg was a little shorter than the right; he could, however, bring the foot to rest on the ground when in the erect posture, by holding any thing to support him, though he could not bear the weight of his body on that leg, nor advance it before the other. He continued to suffer pain in the hip all the time he was in the workhouse.

He was seen on the day of admission by Mr. Travers, who examined him standing and lying down. Both legs were of exactly the same length, the left knee a little more advanced than the right; no alteration could be observed in the appearance of the hip-joint, and the contour of the buttocks was uniform. He could not raise the left thigh from the bed without the assistance of his hands; when standing erect he brought the foot and heel to the ground, but could not bear any weight on it, nor advance it before the other; he had a constant pain in the hip, extending down the thigh to the knee.

Directed to remain quiet in bed, and apply a large blister over the hip-joint. The following week he still complained of pain; the blister was therefore repeated, and with considerable relief.

A third blister was applied to the outer side of the thigh. On Thursday, November 15th, the man's lameness continuing, Mr. Travers again examined the limb, and was much surprised by the following appearances. The injured thigh was found more than an inch shorter than the other; the knee raised and inverted; the foot also turned in; the great trochanter forming a remarkable prominence on the outer and back part of the gluteal region. Rotation outwards caused considerable pain, and the head of the bone could be distinctly felt to strike against the part on which it rested. The thigh could be carried backwards and outwards to some extent, but not inwards or forwards.

The nature of the injury, as it now existed, was very evident; and although a period exceeding three months from the time of the accident had elapsed, Mr. T. determined to attempt the reduction. He was therefore taken into the operating theatre, and placed on a table on his right side, a padded girth passed so as to fix the pelvis, which was then made secure by a cord to a fixed point; a linen roller applied round the thigh, and the padded strap buckled round above the knee, to which the pullies were attached. Extension was then made across the lower part of the right thigh for twenty minutes, without any change being produced. A vein in the arm was opened, and thirty ounces of blood taken. The extension was kept up, and doses of tartarized antimony administered for a considerable time; but neither sickness nor syncope induced. During the extension the leg was rotated, and an assistant endeavoured to raise the

bone by means of a round towel passed over his shoulders and under the upper part of the patient's thigh. This process was continued for near an hour. By passing the fingers from the trochanter along the neck of the bone, the round head could be partially felt, deeply and firmly fixed in its position.

All means having failed to replace the bone, he was removed to bed, for nature to complete that which no doubt she had already commenced—namely, the formation of a new acetabulum.

Mr. Travers in his remarks on this case, says that he can explain it only by supposing one of two primary accidents. 1. The laceration of the teres and capsular ligaments. 2. The comminuted fracture of the acetabulum on its ileo-ischiatic side.

I know that a dislocation may, from hurry or insufficient care, be overlooked or mistaken; but this was not that case, as will be concluded from the facts stated in the narrative. Secondary luxations arise from such casualties as those above-mentioned, and also from destruction of the parts forming the articulation, by the inflammatory, *i. e.* ulcerative process. The last is so marked and so slow a process as to be inadmissible in the present case as a mode of explanation. Its frequency makes surgeons sufficiently familiar with it. Unreduced luxations are generally viewed as opprobrious to the surgeons who have been called to them; but a case like the preceding would be very uncharitably, or rather unjustly, made the subject of a reproachful comment. It is on this account that its publication is important, and that I avail myself of the opportunity of adding a remark or two.

At the end of a month from the accident, I undertake to say positively that no recognizable luxation existed; yet there was lameness and pain in the joint and its extended motions, which led me to suppose it the seat of ligamentous inflammation from the concussion, and to blister it freely. The signs of synovial inflammation, or "morbus coxæ" in its first stage, were not present, and the health was not disturbed. It is now a dislocation so palpable as not to admit of a doubt; and the question is, how and when the bone became luxated in the interval between the end of September and the 15th of November. If the preliminaries to dislocation, (as the tearing through of ligaments, or a breach of the wall of the acetabulum,) had taken place at the moment of the injury, the head of the femur might afterwards be so easily displaced as that its actual escape might be unperceived.

The ulceration of the lacerated capsule, the separation, or perhaps extraneous attachment, of an insulated fragment of the wall of the acetabulum, might either of them be accomplished in this interval without any general or diffused inflammation of the joint.

Subluxations take place, in the shoulder and hip-joints, from injury as well as from disease. Their signs are necessarily, like the displacement, partial and imperfect. As the process of absorption advances, the head of the bone gradually passes on, and then over the border of the receiving cavity, and imperceptibly the semiluxation becomes total. In the ginglymoid joints—*e. g.* knee and elbow—though the semiluxation is yet more frequent, the injury seldom proceeds the length of complete displacement, owing to the different disposition of the articular surfaces as compared with the ball and socket-joints.

Two circumstances noticed in this case serve to confirm the belief that the injury of the ligamentous or bony structure predisposed to the luxation. 1st. The unremitting pain from the time of the accident, and its material relief by the repetition of blisters. 2d. The notorious shortening, disfiguration, and increased lameness observed at the end of seven weeks from the patient's admission; which led to the discovery of the complete dislocation.—*London Medical Gazette, 1st December*, 1832.

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32. *Treatment of Prolapsus Ani.*—In prolapsus ani, produced by the invagination of the rectum or by the relaxation and projection of the mucous membrane of the rectum, the following treatment is recommended by Mr. Benjamin

Phillips, in a communication in the *Medical Gazette* for December last, by which he states that he always effects a radical cure of the disease.

"The reduction having been accomplished, the patient is placed upon a bed; the pelvis is then raised by pillows, so as to make the buttocks the most elevated portion of the trunk; the thighs and the folds of the nates are then so far removed from each other as to enable us with facility to make any application in the vicinity of the anus. A cautery, heated to whiteness, is now placed in the hands of the operator; who makes, according to the gravity of the case, one, two, three, or four applications of the cautery to the margin of the anus.

"The exact point to which the application should be made is dependent upon the gravity of the disease: if it be not of long standing nor obstinate, the application should be made to the margin of the anus, but without implicating the mucous membrane; and the length of the eschar should be about half an inch: this should be the uniform length of the eschar.

"If the case be an aggravated one, the application must be made, not only upon the epidermis, but also upon the mucous membrane.

"It must be borne in mind that the object of the operation is to produce such an eschar as will be followed by suppuration; for in the process of cicatrization which follows suppuration, a fibrous tissue is generated, by which the anus will be so effectually contracted as to prevent the possibility of a recurrence of the disease; and it is upon the accomplishment of this effect that the cure almost entirely depends.

"I have found in every case that the stimulus produced by the application of the cautery has occasioned the development in the submucous cellular tissue of an irritation capable of producing a firm and permanent adhesion of the mucous membrane.

"In this operation, if the iron be properly heated, the pain is inconsiderable. And here it must be recollected that the application upon the living body of an iron heated to whiteness, occasions much less pain than the application of one merely heated to redness, and that the latter occasions much less pain than a gray heat.

"No other dressing than a piece of dry lint is required, and this is retained between the folds of the nates, and removed only when the patient goes to stool: before it is replaced, the anus should be washed with warm water, by which any irritating matter will be removed. After the performance of the operation, the contractions of the sphincter, which have been excited by the application of the cautery, continue sometimes for three or four days.

"If any pain be felt for a short time after the application of the cautery, fomentations of warm water will generally remove it.

"I shall conclude this communication by detailing the particulars of two cases of this disease which occurred some months since: one in a spare man of sixty-two, the other in a child of three years. In the elder patient, in whom there was no hæmorrhoidal disease, the mucous membrane projected whenever he went to stool, and had done so during very many years. Occasionally difficulty was experienced in reducing it; and in consequence of this, on some occasions, it had remained unreduced for many days.

"When I saw him, the prolapsus had existed for nearly four days; there was exhaled from it a fœtid sanious discharge, and it was considerably tumefied. The pain which the patient experienced was very severe whenever the tumour came in contact with his linen, or with any other body. Before I could succeed in reducing it, thirty-six leeches were applied, and a constant fomentation with warm water had been employed for some time. After its reduction, the patient was placed in the position I have already described, and the cautery was applied to the anterior and lateral parts of the anus, including about two lines of the mucous membrane. Some pain was experienced for three or four hours; it was relieved by constant fomentation with warm water. The patient did not go to stool for three days after the operation, and when he did, the membrane no longer protruded, neither has it done so to this day. The younger patient

had suffered from prolapsus during five months; it occurred every time he went to stool. In this case only one cauterization was made, and that at the distance of a line and a half from the mucous membrane.

"The following day, when the child went to stool, no prolapsus occurred, neither has it since. The cicatrization was completed on the twentieth day."

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33. *Case of Laryngitis successfully treated by Laryngotomy.*—Jeremiah Kentish, aged sixty, a labourer, was admitted on the 23d of October into Middlesex Hospital with general anasarca, his legs and thighs being more swollen than the rest of his body. His respiration was difficult, and attended with a wheezing sound, audible at some distance. He complained also of cough, and of inability to lie down in bed; and stated that during the preceding night, he had been nearly "choked." His pulse was hard, but not full. His bowels were reported regular; his urine scanty, though he had a frequent desire to void it.

He declared that the swelling came on suddenly, only five or six days before; that at first his face was so much swollen that he could scarcely see; that he had no previous illness, except a recently slight shortness of breath; and that he knew no cause of the attack.

Sixteen ounces of blood were directed to be taken from the arm, or more, according to the effect of the bleeding; and eight ounces from the chest, by cupping. Four grains of calomel to be given immediately; and a senna draught four hours afterwards.

24*th*. He was bled from the arm to twenty-four ounces, with very little relief to his breathing. The blood in some of the vessels only is buffy. He now says that he lost a pint and a half of blood the night before his admission. His bowels have been thoroughly purged. Urine plentiful, acid, and with a pink sediment. The anasarca has almost entirely disappeared. He is now sitting up in bed, breathing with great labour, and with a loud stridulous noise, which accompanies both inspiration and expiration: he refers all his uneasiness to the larynx, and to the ensiform cartilage. He swallows with difficulty, and every effort of deglutition excites a fit of choking with cough. There is no morbid appearance to be seen in the fauces. He has expectorated a small quantity of viscid, yellowish mucus. Every part of the chest sounds well on percussion, and the murmur of respiration can every where be heard, almost drowned, however, in the louder laryngeal noise.

He vomited freely soon after swallowing a scruple of ipecacuanha. This was followed by no improvement.

Twelve ounces of blood to be taken by cupping from the back part of the neck. Three grains of calomel to be given every three hours; and one-third of a grain of the acetate of morphia immediately after the cupping.

During the afternoon the steam of hot water was inhaled for some time, and twenty leeches were applied near the larynx.

In the evening the difficulty of breathing increased still more, and each act of respiration was attended with a loudy croupy sound: his countenance was now anxious and ghastly, and his pulse was less firm. It was Dr. Watson's opinion that he would probably not survive the night, unless the operation of tracheotomy was performed, and that his general condition was such as to afford good ground for hoping that his life might thus be saved. Between 8 and 9 o'clock, he sent to request Sir Charles Bell's assistance, who immediately attended at the hospital. Mr. Joberns and Mr. Arnott were also present; and all agreed upon the propriety of proceeding to the operation forthwith.

Although the patient was placed in a bed at the further extremity of the ward, the crowing sound of his breathing could be heard before entering. Upon approaching him, he was seen sitting forwards, moving with restlessness from one side of the bed to the other, and throwing his arms about, as if seeking for some new place of support. His countenance was pale and expressive of great anxiety, and his lips were of a livid blue colour. His shoulders were in continual action, being alternately elevated and depressed to the utmost; and the

prominent larynx moved up and down in a remarkable manner, corresponding with the laboured heaving of his chest. He spoke with sudden, and as it were, convulsive efforts, earnestly expressing how thankful he should be to have the obstruction of his breathing removed, and said that in every other respect he felt easy, being free from pain except at one part, pointing with his finger to the lowest part of the larynx.

It was remarked how very short the space between the larynx and the sternum was, and that when the larynx was drawn down by the action of its muscles, there was scarcely half an inch between the upper part of the cricoid cartilage and that bone.

The operation was begun by pinching up the skin over the space between the thyroid and cricoid cartilages, and then dividing the fold thus made with the knife. Two small arteries, which threw out a stream of blood more than two feet, had to be secured by the ligature. After dissecting a very little, the point of the knife was thrust into the membrane, which joins the forepart of the thyroid and cricoid cartilages, and the blood in the wound showed by its frothiness that the air-passage was opened. The longitudinal slit which was thus made, was enlarged by cutting with the bistoury sideways; and after this was done, it was attempted to introduce a silver canula into the trachea. But as soon as this instrument entered the larynx, a dreadful paroxysm of suffocation was the consequence: the patient gasped, struggled, and drew his breath with a moaning sound, occasionally interrupted for some seconds, as if he were on the point of ceasing to respire altogether; and it was a considerable time before he could be restored from this attack so as to submit again to the operations of the surgeons. It was next attempted to keep the slits of the wound apart by introducing a catheter wire, previously bent upon itself, into the opening; but another paroxysm of suffocation, more alarming than the former, and lasting a greater while, was immediately produced; and the interrupted and vain attempts to express his distress with words, the laborious heavings of his chest, the perspiration starting in drops from his face and brow, all showed the intolerable nature of his sufferings, and how impossible it was to retain such an instrument in the wound. Finding it thus impracticable to preserve a tube within the trachea, it was resolved to remove as much of the membrane which surrounded the opening already made in the larynx, as would permit the air to have a free passage into the lungs. Upon commencing to do this, it was astonishing to every one to what a depth the larynx was withdrawn, it being not less than an inch and a half from the surface of the wound. What principally, however, created a difficulty in the object proposed by the operator was, that the inner membrane of the larynx had become so extremely irritable, that whenever it was touched, however slightly, by the hook, the blades of the scissors, or any other instrument, a fit of coughing and an attack of laborious breathing were excited. Besides this, the larynx had a continual rapid movement upwards and downwards, (resembling the incessant rising and falling of the piston of a steam-engine at work:) and thus the depth of the larynx, the extraordinary irritability of the mucous membrane, the constant movement of the windwipe, together with the filling up of the wound with blood, as quickly as it was sponged away, all conspired to make it an operation of great difficulty to remove the angles of the membrane that were left. Another circumstance was observed deserving of attention, since it prevented respiration being performed through the orifice in the larynx: at each inspiration the lips of the opening, which were seen to be expanded during expiration, became completely shut; and this was obviously consequent upon the thyroid and cricoid cartilages being drawn, by the action of their muscles, more closely together during the act of inspiration. Sir Charles Bell remarked that the spasmodic action producing this shutting of the orifice, even caused the cartilage to pinch the point of his finger when it was applied over the part: and it was from observing this fact, that to some of the witnesses of the operation it appeared indispensably necessary to have a tube inserted into the windpipe.

The cricoid cartilage was so hard, that it was supposed to be ossified: and whenever the bistoury or strong scissors were employed to cut a piece out of it, fresh paroxysms of suffocation were produced. Several loose portions of membrane were removed from the orifice in the larynx, and also those loose portions of the cellular membrane which were in danger of being sucked inwards during respiration were snipped away. Two catheter wires were then employed to hold the integuments apart: this was accomplished by doubling each of the wires, and forming their bent extremity with a hook, resembling that which is sometimes used for holding the eyelids separate in operations upon the eye: one of these hooks being inserted on each side of the exterior wound, and the wires being bent round and fastened at the back of the neck, the surface of the windwipe was kept freely exposed to the air. When this contrivance had been applied for a little, the breathing became greatly improved; and as an indication of the relief which the patient had received, he fell sound asleep. The crowing sound continued, which proved that his breathing was not altogether performed through the wound. An assistant had to be placed behind the bed-chair to prevent the patient's head from nodding forwards in his sleep, which he had already shown deranged the apparatus in the wound. The pulse was 93, and of good strength.

Three grains of calomel to be taken every two hours.

25*th*. He passed a tolerably good night, sleeping a good deal at intervals. The aperture is smaller by the swelling of the soft parts. The respiration is carried on chiefly through the wound, but with labour and hissing, and occasional expulsion of viscid mucus. Last night a small portion of his powders was observed to issue at the wound; and the same thing has since happened upon his swallowing milk. He can swallow liquids only; and he experiences some difficulty, apparently, when they are in the act of passing through the bag of the pharynx. The sound over the chest, on percussion, is good: some large crepitation is heard by the stethoscope. The pulse is smaller, and wiry. His bowels have been once opened. He is to continue his medicines, and to take arrow root and milk from time to time.

Vespere.—He is much more comfortable; a metallic tube has been introduced into the trachea, through which he respires easily. His breathing is attended with but little noise. He has an urgent occasional cough, which is relieved by expectoration of tough mucus, partly through the tube and partly by the mouth. His bowels have been opened five times. His pulse is above 100, small and sharp; his tongue is clean.

Opii, gr. ½, statim. et adde sing. pulv. opii, gr. ½.

26*th*. He has passed a good night, sleeping a good deal. The pulse is more tranquil and natural. His tongue clean and moist; his countenance is greatly improved; he has had three stools. An opiate enema was administered. In other respects he is the same as at the former report.

27*th*. He has had a good night. He speaks better, but he does not breathe more easily through the natural passage. His gums are tender, and he has the mercurial fœtor. The calomel is to be omitted.

28*th*. He is going on well, and his countenance is more natural. A larger tube has been inserted.

29*th*. He is improving; the tube has been out for about an hour, and he breathes easily through the wound, which is suppurating. When the opening is closed, he soon begins to be distressed; though he seems to breathe better through the natural passage than he did. The fits of coughing have been less frequent and less violent, and the expectoration less viscid. He asks for more food. The act of swallowing is more easy, but it still produces a little coughing; and a small quantity of the fluid which he takes still passes occasionally by the wound. The pulse is 82, of moderate strength; the bowels are open; his gums are very tender. He is to have three eggs a-day, beat up with his milk.

30*th*. He has passed a bad night, with much coughing and expectoration.

The tube, by some misunderstanding, has been left out since yesterday morning. A portion of his liquid food still appears occasionally at the wound. The bowels are open; his gums tender; the pulse as before. The tube is to be immediately replaced.

31*st*. He has been more comfortable since the tube was replaced, and seems to be much in the same condition as before its removal, except that his pulse is rather more frequent.

Nov. 6th.—The tube has been out since the 3d, and he has continued to breathe comfortably through the aperture, which is contracting. He breathes partly through the mouth, and can bear to have the wound closed for a little time without inconvenience. His gums are still tender. He sleeps well; his bowels are regular; his pulse is good, and his appetite keen. Occasionally a small portion of his food shows itself at the wound. He swallows much better, and seldom coughs after doing so.

16*th*. He breathes through the natural passage, and the opening is completely closed. His pulse is 95. He is somewhat hoarse, and says he has a feeling of soreness in the windpipe internally, in the situation of the wound.—*Lond. Med. Gaz. Dec.* 1*st*, 1832.

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34. *Case in which the Arm and Scapula was torn off, without fatal consequences*. By Jno. Braithwaite.—July 12th, 1832. Peter Naidin, aged twelve years, subject to epilepsy, and of a scrofulous habit, whilst working at a carding machine, fell, it is supposed in a fit, and was caught by the right arm in a revolving strap, which carried him up to the ceiling, and tore off the arm and scapula. When seen about half an hour after the accident, he was pale and faint, but there had not been a very profuse hæmorrhage. The axillary plexus of nerves had been pulled out, and hung loose from the detached limb, to the length of two or three inches. The artery was seen pulsating at the bottom of the wound, and was plugged up by a coagulum of blood. The vein was distended, and lay upon the torn muscles like a gorged leech. The integuments presented an appearance as if divided by a sharp cutting instrument, and formed a semilunar flap from above. In attempting to pass a ligature round the vessel it slipped from the grasp, and a violent gush of blood ensued; but it was immediately seized by a tenaculum, and the hæmorrhage restrained by the application of a single strong silk thread. A ligature was also applied to the vein, and a small artery was likewise tied. The flap was carefully adjusted, and secured by two ligatures, and plaster straps and pledgets of carded cotton were laid over the whole, and retained by a broad roller, which bound down the clavicle, and prevented it putting the skin upon the stretch. A little brandy and water was given, the boy was sent home to bed, and a draught, with gtt. xxv. Træ. Opii, was administered. No unfavourable symptoms followed, the boy only complained of slight sickness, and of soreness, as if from bruises. It would be superfluous to state the progress of the symptoms and of the treatment: it will be sufficient to add, that the wound was first dressed on the 16th instant, and a healthy purulent discharge established on the 18th. The ligatures came away on the 3d August; but a large cavity over the site of the scapula continued to discharge very freely. A seton was passed through this to excite the growth of granulation, without effect, but adhesions of the entire flap was subsequently accomplished by injecting a solution of alum, of the strength of a drachm to the half pint. The boy is now perfectly well, and suffers no inconvenience from the scapular end of the clavicle, which does not project so much as to endanger the safety of the skin.—*Lond. Med. Gaz. November* 3*d*, 1832.

The celebrated case of the miller, whose arm and scapula were torn off, related by Cheselden is well known. A similar case is also recorded by S. F. Scarnell, in the Lancet for 28th April, 1832.

CHOLERA.

35. *Treatment of Cholera by Cold, as Practised by* Dr. Caspar, of Berlin.—Dr. Caspar was first led to employ cold externally in cholera from the advantage derived from it in the treatment of asphyxia from cold. Physicians originally treated such patients, as cholera has since been treated, by the application of heat; but this practice has long since yielded to frictions with ice, snow, &c.

Cold affusions had been previously tried at St. Petersburgh and at Riga, but stimulants had been always given internally at the same time. The result of this method not having answered the hopes which were entertained, it was abandoned. Dr. Caspar does not proceed in this manner. He advises the employment of cold in the boldest manner; and that inert medicines alone should be used in conjunction with this agent. His method is as follows:—The patient is to be placed in an empty bathing-tub, if his skin is dry and flabby; but if, on the contrary, it is covered with a slight moisture, or a profuse clammy sweat, the bathing-tub is to be filled, with water heated to 27° of Reaumur, (92.75 Fahr.) just up to the navel of the patient.

An assistant on each side supports the patient, so as to keep his back from the sides of the bathing-tub; then four or five buckets of iced water are thrown over his head, breast, and back. The quantity of water for a child is from one to three buckets. In very severe cases there is no reäction; in cases less severe the patient sighs, and sometimes makes an effort to escape. The slight reäction which takes place in the commencement would astonish those who have not yet employed this therapeutic agent. At a more advanced period the reäction becomes more sensible: this symptom is favourable.

Conjointly with these perpendicular affusions others are made in a horizontal direction, dashed from a certain distance, with as much force as possible upon the chest and stomach. Two buckets of very cold water are sufficient for this operation, half the quantity for a child. The patients in the commencement exhibit but a very slight, and hardly any impression. These cold dashes ought to be administered as promptly as possible, and repeated according to the severity of the disease every two or four hours. Dr. Caspar says that he has often employed twenty of them in the space of two days or two days and a half; ordinarily ten or twelve will suffice.

After the affusion the patient is to be put to bed, and to be covered up to his neck with woollen blankets well warmed. Under these coverings cold compresses are to be applied over the whole of the chest, abdomen, and back. It is indispensable to change them as soon as they become warm. The author regards these compresses as the principal agent in his method, because they, according to him, cause a new reäction. In the commencement those who are severely affected are equally insensible to these applications, but a little later the reäction becomes visible. It should be regarded as a favourable sign when the patient complains of the cold. Dr. Caspar does not think that cold compresses ought to be applied to the breasts of women who are suckling.

The head is also to be covered with cold compresses. They should even be resorted to in cases of slight cholera when the affusions are not employed. No other treatment, according to this author, so surely prevents the typhoid fever. Besides he has remarked that typhus succeeds rather mild cholera, than that which shows itself in all its intensity.

Dr. Caspar causes the feet of cholera patients to be enveloped in woollen cloths steeped in warm water. As much as he is opposed to the apparatus for heating the trunk of the body, as vapour baths, &c. yet he advises that bottles filled with boiling water should be applied to the feet. Often he even orders the lower extremities up to the knees to be placed morning and evening in warm water, to which six ounces of sulphuric acid has been added.

The application of cold compresses should be continued night and day until the pulse reäppears, or from small and contracted becomes fuller.

Dr. Caspar also gives his patients cold spring water to drink, or if the patient prefers it, cold beer. He rejects entirely the use of warm drinks. He also administers cold water enemata, and considers them as particularly indicated when there is constipation, and when the movement of a fluid in the intestines can be felt on the application of the hand to the abdomen. It is then that this author orders one or two enemata each day, composed of equal parts of cold water and of vinegar, sometimes with the addition of a spoonful of kitchen salt. These enemata generally act very promptly, provided the patients, as is seen in old men, are not affected with a paralysis of the intestinal canal. Notwithstanding this, it must not be imagined that Dr. Caspar employs cold in all cases, and in all the periods of cholera. On the contrary, he modifies it according to the individual cases, and the forms which this disease presents. With this view he indicates three principal varieties of cholera—1st, mild cholera, or that which has been called cholerine. 2d. Asiatic *febrile* cholera, in opposition to that cholera in which there is a complete absence of pulse: but the author himself admits the inaccuracy of this definition. The treatment which he applies to this form is that which we have described previously. He joins to that an emetic, if the patient exhibit signs of gastric embarrassment, but only in that case. 3d. Cholera *sine pulsu* or cholera asphyxia, that which demands at the first onset the bold use of the affusions and cold dashes.

By this treatment reäction is speedily induced. Then Dr. Caspar is accustomed to draw twelve or fourteen ounces of blood, or fewer if the symptoms of local congestion be less marked. The compresses of iced water are continued during this period only upon the head. He prescribes besides, in the greater number of cases, calomel in conjunction with rhubarb: from three to four grains of calomel, with four grains of rhubarb, every hour in the case of adults. Dr. Caspar has renounced completely the employment of stimulants, even in the typhoid stage, during which he continues the affusions of cold water and compresses to the head.

Although Dr. Caspar points out the method of treatment by cold as the most advantageous, he is far from thinking that it will effect a cure in the majority of cases; he admits that the greater number of cholera patients die whatever may be the treatment which is adopted. However, the following are the conclusions which he believes may be drawn from his observations upon the comparative use of cold and of other remedial methods in cholera.

1st. The treatment by cold is suited to the nature of this disease, (Dr. Caspar regards cholera as consisting in a paralysis of the cutaneous system,) or if that pathology is not admitted, to all its most marked phenomena.

2d. When applied with circumspection, more patients are cured by it than by any other method.

3d. It produces a surprising amelioration in the most severe forms, and in the most serious period of cholera, when no other medication has any effect.

4th. It more surely than any other method prevents the consecutive typhus.

5th. It suits itself more easily to the taste and wants of the patients than the stimulating method.

6th. In cases where death is inevitable it prolongs life as long as possible.

7th. This method is simple, costing very little, and easy of application.

Dr. Caspar has added to the exposition of his method, a great many cases which attest its success.

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36. *Statistics of Cholera Morbus in London.*—According to the London bills of mortality, the number of burials for the year 1832 was 28,606, whilst those for 1831 amounted to 25,337, being an increase of 3,269 for the last over the preceding year. It further appears that the deaths from cholera amounted to only 3,200, showing a trifling increase in the burials of 1832, when all the cholera cases are deducted. The epidemic first assumed importance in London during the week commencing with March 6th, when there were twenty-one

reported burials; and its violence subsided with the week ending on the 8th of May, there being in the succeeding weekly report only three deaths arising from the disease. In this space of ten weeks the total number of burials was 6,598, 557 of which are stated to have arisen from cholera; while in the corresponding weeks of 1831, there were only 4,107 burials of those who died from all kinds of disorders. For a short time the cholera was nearly extinct; but in the week beginning July 3d, we find fifty-five deaths occurring from that complaint, which then assumed a severe character until the week ending October 30th, at which time we find only thirteen deaths happening in the interval. During this period of seventeen weeks, the total number of burials was 10,357; the number from cholera being 2,403. In the corresponding weeks of the preceding year the aggregate amount of interments was only 6,114; so that we plainly perceive the mortality from other diseases became more intense during the whole time that the malignant cholera was in action. It is a fact, moreover, which holds true in the detail, that the mortality from independent diseases was not lessened, even in those weeks when the cholera was especially fatal; but that, on the contrary, the deaths from other causes were mostly beyond the average, after the deaths from cholera have been deducted. This will be seen in a moment by reference to the following table.

Weeks of the Years 1831–2.	Deaths in 1832.		Deaths in 1831 from all Diseases.
	From Cholera.	Other Diseases.	
27th.	55	476	244
28th.	108	496	352
29th.	158	450	529
30th.	380	588	350
31st.	305	488	346
32d.	127	534	592
33d.	103	379	332
34th.	116	428	382
35th.	274	747	277
36th.	157	267	464
37th.	257	697	650
38th.	154	514	269
39th.	39	442	472
40th.	73	548	253

37. *Comparative View of the Various Modes of Treatment adopted in Cholera, within the Jurisdiction of the City of London Board of Health, transmitted by* Mr. F. De Grave.

	Cases.	Deaths.	Recoveries.	Deaths per cent.	Recoveries per cent.
Calomel and opium -	196	112	84	57.14	42.86
Opium - - - - -	81	47	34	58.	42.
Calomel - - - - -	75	35	40	46.66	53.34
Stimulants - - - -	63	42	21	66.66	33.33
Combination of salts proposed by Dr. Stevens	25	22	3	88.	12.
Combination of salts used at Greville st. hospital	26	8	18	30.77	69.23
Venous injection - -	20	18	2	90.	10.
Miscellaneous - - -	17	8	9	47.06	52.94

Lancet, Feb. 2, 1833.

38. *Antiphlogistic Treatment of Cholera.*—During the first invasion of Paris by cholera, 23 patients were treated by Dr. HUET DESPRES in the temporary hospital *De la Réserve.* The treatment was essentially antiphlogistic. Of the number mentioned 4 only died, 19 were cured.—*Annales de la Méd. Phys. June,* 1832.

CHEMISTRY.

39. *Analysis of Camphor and some Volatile Oils.*—M. DUMAS observes, that essential oils may be divided into—first, those which are entirely composed of carbon and hydrogen, such as the oil of lemon, turpentine, and naphtha; secondly, oxygenated oils, as camphor, oil of aniseed, and many others; thirdly, the essential oils which admit of a new element in their composition, as the oil of mustard, which contains sulphur, and that of almonds, which contains azote.

Some fine isolated crystals of camphor taken from the centre of a sublimed cake of that substance, yielded such proportions of carbonic acid and water as by M. Dumas' calculation gave per cent. very nearly

Carbon - - - - - - -	79.28
Oxygen - - - - - - -	10.36
Hydrogen - - - - - - -	10.36
	100.

Neglecting on this, as on other occasions, the atomic weights adopted by M. Dumas, it will be seen that camphor is composed of

Ten atoms carbon - - - -	$6 \times 10 = 60$	or 79
One atom oxygen - - - -	8	or 10.5
Eight atoms hydrogen - - -	$1 \times 8 = 8$	or 10.5
	76	100.

Proust discovered the existence of camphor in oil of lavender; M. Dumas analysed some crystals of lavender camphor procured from the College de France: the results were perfectly similar to those obtained from common camphor.

M. Dumas considers camphor as composed of a peculiar carburetted hydrogen, (to which he gives the name of *camphogen,*) and oxygen, or ten atoms carbon + eight atoms hydrogen; or

Camphogen - - - - - -	68	89.4
One atom oxygen - - - - -	8	10.6
	76	100.

The density of the vapour of camphor was found to be 5.468, and M. Dumas observes, that supposing it be composed of a volume of camphogen = 4.7634 + half a volume of oxygen = 0.5513, its density would be 5.3147, which comes very near to the experimental result. Oil of turpentine was found to be constituted precisely of the same proportions of carbon and hydrogen as camphogen:—the density of its vapour was by experiment 4.765 to 4.764, which agrees with the analysis.

When oil of peppermint is cooled to about 32°, it yields prismatic crystals, readily separable from the fluid part. These crystals pressed between folds of blotting paper, are colourless; fusible at 75° Fahr.; volatile without decomposition, and again crystallize; they are very slightly soluble in water, but dissolve in alcohol, æther and oils. They have the smell and taste of peppermint in a great degree. By analysis it appeared that this camphor was composed of 77.3

carbon, 12.6 hydrogen, and 10.1 oxygen in 100 parts; and it differs from common camphor in containing two more volumes of hydrogen.

The solid portion of oil of aniseed yielded by analysis, in 100 parts, 81.35 carbon, 8.26 hydrogen, 10.39 carbon: by adjusting these results, slightly, it appears that oil of aniseed contains two volumes less of hydrogen than common camphor.

M. Dumas conceives that essential oils are compounds of hydrogen and carbon, which, by oxydizement, produce camphors; this degree of oxydizement, however, is not to be confounded with the higher degree of it, which occurs when the oils are freely exposed in thin strata to the air, for they are then converted into resins.

It appears from these experiments, that

10	carbon	10	hydrogen	1 concrete oil of peppermint.
10	do.	8	do.	1 oxygen form common camphor.
10	do.	8	do.	oil of turpentine.
10	do.	6	do.	1 concrete oil of aniseed.
10	do.	4	do.	naphthaline.

M. Dumas is disposed to believe that the absorption of oxygen by essential oils, produces different effects according as it occurs under the influence of water, or when dry. The constitution of pure oil of lemons appears to be perfectly similar to that of oil of turpentine by M. Dumas' analysis, and it differs very little from that of M. Th. de Saussure. M. Dumas finds naphtha to be composed of 6 atoms carbon + 5 hydrogen; a conclusion which also agrees nearly with that of M. de Saussure; the density of its vapour should therefore be 2.870, which varies but slightly from that obtained by experiment.—*Rep. Pat. Invent. March*, 1833.

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40. *Process for Obtaining Conia.*—Mr. Golding Bird recommends the following process for obtaining conia. "Digest the fresh leaves of conium maculatum in alcohol, and set aside for some days and strain the mixture; boil the alcoholic tincture for a few minutes, and when cold filter. By this operation a solution is obtained of malate of conia with extractive and some salts; decolorize with animal carbon, again filter, and add to the clear liquor a solution of carbonate of soda. A precipitate of carbonate of conia will fall, which must be dried and dissolved in acetic acid; ammonia will now throw down conia quite pure.

"Conia, as thus obtained, is a powder perfectly white, slightly soluble in water, and very soluble in alcohol and æther. It turns red litmus paper blue, and combines with acids, forming in some cases crystalline compounds, in others gummy masses. When heated with nitric acid, a brownish-yellow solution is formed, and, by evaporation, oxalic acid is obtained. When dilute nitric acid is used, a nitrate is obtained in fine needles.

"When attempting to prepare conia according to the German process, after obtaining the spirituous extract and adding water and protoxide of lead, a lamp heat was applied: a dense, fœtid, suffocating vapour was given off, smelling intensely strong of hemlock, and producing a violent sensation of asphyxia; while, on the surface of the fluid, there appeared films of an oily matter. This operation was repeated in an alembic, and the vapours were condensed in a cool receiver. I thus obtained a volatile oil, very inflammable, and smelling powerfully of hemlock."—*Lond. Med. Gaz. November 3d*, 1832.

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41. *Analysis of the Leaves of the Conium Maculatum.*—Mr. Golding Bird has obtained the following results from the proximate analysis of the leaves of the conium maculatum, 1. Malate of conia; 2. A fœtid volatile oil; 3. Chlorophylle; 4. Resin; 5. Fœculin; 6. Albumen; 7. Lignin; 8. Acetates of potass and ammonia; 9. Malate of lime. The ashes contained traces of, 1. Chloride of sodium; 2. Protoxide of iron; 3. Magnesia; 4. Lime.—*Ibid.*

AMERICAN INTELLIGENCE.

Case of Scarlatina Maligna successfully treated by Cold Water. By Samuel Jackson, M. D. of Northumberland.—[Communicated in a letter to the Editor.]—My oldest daughter, of 11 years, was, a few weeks ago, seized of cynanche maligna, with far more fever than usually attends that malady. Her fauces were universally inflamed, and on the second day, the cineritious specks appeared. I bled her in the height of the evening paroxysm to 8 or 10 ounces, though I knew that the fever was certainly typhus, with the pulse 160. But the difficulty with me consisted in the choice of gargles. From some experience and much contemplation last fall, I had fixed my mind on sac. sat. as the most proper *till* sloughing might take place.

To this then I resorted, but quickly became dissatisfied lest she might swallow so much as to cause lead colic. The nitrate of silver was then tried, 24 grains to the ounce of water. From this I had some hope, derived partly from the Medical Recorder, Vol. XIII. p. 123, and partly from the known effects of a milder solution in ophthalmia. But I soon became dissatisfied with the use of a stimulus to parts so highly inflamed, notwithstanding all that has been said in favour of stimuli in these cases. My anxiety on this point became excessive, for I was possessed of the opinion that on the speedy improvement of the local disease depended the fate of my child. I had lately seen cases successfully treated by my friend Dr. Vanvolsap of Lewisburgh, eight miles above us, by means of stimulating gargles, particularly the capsicum, but I could not prevail on myself to use them till further mortification might reduce the inflammatory action.

Cold water she desired above all things, and I determined to give it a fair trial. She was then permitted to drink the coldest ice water, and to hold ice in her mouth. But this last experiment was dangerous lest she might swallow it, and bring on spasms of the stomach. It was then enclosed in a gauze bag, and put far into her mouth to be dissolved and swallowed. Now for the first time, the fourth day of her disease, I felt satisfied with my prescriptions, and she was desired to use the ice freely, and to drink largely of ice water. The good effects were immediate, surprising, incredible, and almost divine. Within a few hours the pulse was reduced from 160 to 120; the circumscribed crimson disappeared from her cheeks; the extremities became warmer as the fauces and stomach were cooled; the whole countenance was changed; the typhus distress left it, and something of the vivacity of common fever supervened. No other remedy was thenceforward used except some laxatives, and in three days from the time the ice was tried, there was no fever left, nor any sign of inflammation in the fauces.

This disease was, last fall, epidemic a few miles above us, and some died. One of my other children had it in the course of the winter, but very slightly; and, as I hope to have no further need of this remedy, and can give it no further trials at present, I commit it to your consideration. I have just heard that scarlatina cynanchica is mortal in your city, and as this is certainly the same disease as the cynanche maligna, I hope you will give my remedy whatever attention it may seem to merit independent of what little I have done.

Account of the Epidemic Cholera as it occurred in Newcastle, Delaware. By James Couper, Jr. M. D. [Communicated in a letter to Dr. J. K. Mitchell.]—In compliance with your request, I send you the following account of the

epidemic cholera as it appeared in the town of Newcastle, Delaware, in the month of August, and the beginning of September of this year, (1832.)

The town contains a population of about one thousand, and enjoyed in the early part of June last, an almost total exemption from disease of every description. On the 18th of that month, however, I saw the first case of ordinary cholera, which occurred in my practice during the summer. This was soon followed by other cases; and between that day and the 23d of July I was called on to prescribe for thirty-three instances of that disease—a very unusual number, when compared with the practice of former years. Most of the cases were mild and very manageable by the common remedies, but some of them were severe, accompanied by spasms of the extremities and light coloured discharges, and proved difficult of management. It is remarkable that the proportion of severe cases during the period above-mentioned corresponded very closely with that of the fatal cases of the subsequent epidemic. No death occurred among these thirty-three patients.

On the 25th of July I left home for about a fortnight. While I was absent, two or three cases of the epidemic cholera were landed at Newcastle from vessels navigating the Delaware; but the first case among our own population occurred in the person of a little boy on the 6th of August. This child had not been out of town. From this time the disease continued to extend until the 17th of August, when it ceased for a while, but reäppeared on the 29th of the same month, and continued until the 5th of September, when, as we hope, it finally disappeared from among us.

The exciting causes of the disease were various, and embraced many irregularities in diet, drink and exposure. Eleven of the first cases had a common exciting cause, namely, oysters in a state of commencing putrefaction. A vessel arrived here a day or two before the date of the first case, with a cargo of oysters in that condition, and having on board the body of a man dead of cholera. So far as I can learn the particulars, all who partook of these oysters were more or less severely affected with cholera, and but few of them escaped with their lives. Fruits also, either unripe or in excess, were frequently the exciting cause of the disease.

The symptoms of confirmed cholera here, were those which have been so often and so accurately described by writers upon the subject, namely, vomiting and purging of the "rice water" fluid; total suppression of bile and urine: cold tongue and breath; pain in the epigastric region; incessant thirst; cramps in the extremities and abdominal muscles, and in one fatal case which I saw, spasms of the muscles depressing the lower jaw; cold skin, corrugated upon the hands and feet; profuse cold perspiration; blueness of the nails, lips and tongue; livid circles around the eyes; change or loss of voice, and a peculiar, utterly indescribable expression of anxiety in the countenance. The pulse varied considerably in different cases. In some it was full and strong at first; while in others it was feeble from the beginning. The skin, though usually cold, was found to be warm in two or three of the most severe instances. The blood, when drawn, was uniformly black and thick, but these appearances were not confined to cholera cases, for I found them in blood, drawn at an advanced period of pregnancy to relieve fulness of the head, in the case of a lady, who had never suffered from any of the symptoms of the then prevailing epidemic. The mind was undisturbed in a large majority of cases, though in one instance delirium occurred, and in another coma, which soon passed off and left the patient, a young negro man, perfectly frantic. In this state he continued till his death, requiring constantly the strength of several assistants to confine him to his bed. The first cases were much more violent than most of those that came after, although one of the very last cases was marked by as great malignancy as any which preceded it. Every case which came under my care had suffered from a previous diarrhœa. During the continuance of the epidemic, affections of the stomach and bowels were almost universal among our popula-

tion, and all complained of greater fatigue from muscular exertion than they had ever before experienced.

The treatment consisted of blood-letting, when that remedy was indicated by a strong, full or oppressed pulse; free doses of calomel in conjunction with camphor and opium, or the sulphate of morphia; very liberal inunction with camphorated mercurial ointment and Cayenne pepper; sinapisms to the epigastric region and extremities; large injections of warm water, with or without brandy or Port wine and laudanum, according to circumstances; dry heat to the extremities by means of bags of heated sand, and cups and blisters to overcome local determinations. Whenever time could be obtained to produce the slightest constitutional effect of mercury, recovery always took place. My intercourse with cholera soon satisfied me that opium, laudanum, and sulphate of morphia in large doses were really much less necessary in the treatment of this disease than I had expected. In most cases the vomiting and purging were not very difficult to overcome, and in many of the very worst instances these discharges were comparatively trifling. A similar disappointment occurred to me in the application of heat. Though it appeared to be very urgently demanded by the symptoms, still the benefit was by no means so great from its use, as from the report of others, I had been led to expect. The vapour of burning alcohol, which I applied in one or two cases, by means of Jenning's apparatus, seemed to me not only not beneficial, but positively injurious, by increasing the distress and restlessness of the patient. The same objection may, perhaps, apply to the very free use of bags filled with highly heated materials—a practice which obtains so generally in the management of the cold surface of cholera patients. As to those cases which present a very doubtful pulse, when the question of blood-letting comes before the practitioner, I would remark, that though some such were saved by that remedy, still in a majority of the patients the pulse was found to sink under the loss of a very small quantity of blood. The premonitory diarrhœa was often difficult of management, and required the free use of the lancet and the subsequent employment of large doses of the sugar of lead in combination with calomel and opium.

Forty-one cases of the epidemic cholera occurred in my practice. Twenty-seven of these belonged to the white population, and fourteen to the black. The former included nineteen male and six female adults, and two male children—the latter four male and nine female adults, and one female child.

Of these forty-one, fifteen patients died, viz. seven male adults and one male child, (whites,) and three male and four female adults, (blacks.)

There were two instances of second attack and one of relapse. These three patients recovered.

While the epidemic prevailed in this place, we had little else than that single disease in its various forms to treat; and now that it has passed over, it has not left behind it even the ordinary, small amount of autumnal disease.

Newcastle, Delaware, Nov. 8th, 1832.

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Case of Traumatic Tetanus, successfully treated. By A. C. Baldwin, M. D. of Georgia.—On the 7th of January 1833, I was called to visit a negro boy, aged about six years. On examination I found he was labouring under tetanus, and that his body was bent back by the spasmodic contraction of the muscles, forming that variety of the disease called opisthotonos. A splinter in the foot was the only cause to which the origin of the affection could be attributed, and this had been removed on the day preceding my visit. The wound had suppurated, and on being opened, the splinter had been discharged.

Aware of the great torpor of the bowels in tetanic affections, I determined on the exhibition of a cathartic as soon as possible, with the hope of securing all the advantage which could be derived from early purging, before administering the usual remedies employed in such cases. A combination of equal parts of the oil of turpentine and castor oil was accordingly directed, in doses of a table-spoonful frequently repeated. A blister was applied to the spine, and

the foot was enveloped in a lye poultice. On the day following, I found that the blister had drawn well, and that the bowels had been freely evacuated; yet my patient was growing worse, and could swallow only with the greatest difficulty. To relieve pain, and to produce relaxation, I directed a combination of equal parts of laudanum and antimonial wine, to be taken in tea-spoonful doses, every one, two or three hours, as the circumstances of the case might require. The more violent the pain, and the more formidable the spasm, the more frequently was the medicine to be exhibited, and vice versa. To assist in fulfilling the same indications, a poultice of tobacco was prescribed as an application to the blistered surface with the express direction, that it should be instantly removed if any of those untoward symptoms should occur which usually characterize the deleterious operation of this powerful article.

The opium and antimony thus combined, acting conjointly with the poultice of tobacco, seemed to controul the disease, and from that circumstance were continued from day to day; and, with the exception of a little castor oil, occasionally administered, were almost the only remedies employed in the management of the case during the time of its continuance. As soon as one blister would heal, a second was applied on or near the same place, and the raw surface was dressed as before stated. In the preparation of the poultice which was employed, half a pint of boiling water was poured on an ounce of tobacco, and after a strong infusion was formed, sufficient quantity of bread was added to give the proper consistence.

Although the progress of the disease was checked by the opium, antimony, and tobacco, yet entire relief was not immediately obtained, and the affection remained for some weeks stationary, during which time the patient was scarce able to move without renewing or increasing the spasm, and could swallow nothing but liquids, and those with considerable difficulty. It was between the third and fourth week when prospects of a recovery began to make their appearance. From that time the affection very gradually diminished, and he by degrees acquired the power to move, sit, and stand up, although it was six or seven weeks before he was able to walk any of consequence. At this time, rather more than two months since the commencement of the attack, he is walking about perfectly recovered, although considerable stiffness yet remains, and he has not acquired that power over the muscles which he possessed before the commencement of the disease.

Having witnessed the treatment of three or four cases of tetanus, in which opium in large doses was the only remedy employed, every one of which terminated fatally, I took up the idea, that this formidable complaint could not be controlled by this remedy alone, or that if the spasm yielded to its remedial influence, the injurious effects of such large doses of this article on the system, more than counterbalanced the benefit thus acquired, and probably in a majority of cases contributed in bringing about a fatal termination. Influenced by that opinion, I determined in the management of this case, to give it in such doses as I thought would secure its anodyne and antispasmodic effects without producing those injurious consequences to which I have adverted; and at the same time to combine with it such remedies as would probably assist in fulfilling the indications desired. Whether my opinion was right or wrong is left for others to determine. The result, at all events, of the case in which my practical views were enforced, was favourable, and would seem to justify the practice. The union of the opium and antimony seemed to have this good effect; the combination thus formed was less heating than the laudanum would have been if given alone, and by its relaxing influence acted on the skin as a diaphoretic. Neither nausea, nor vomiting, nor any other unpleasant effect resulted from the application of the tobacco. On the contrary, relief was always experienced from its operation, whether employed alone or in combination with the remedies already enumerated.

St. Clair, Burke County, Georgia, March 11th, 1833.

STATEMENT OF DEATHS,
With the Diseases and Ages, in the City and Liberties of Philadelphia, from the 1st of January, 1832, to the 1st of January, 1833.

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DISEASES.	Males.	Females.	Boys.	Girls.	Under 1 year.	From 1 to 2.	From 2 to 5.	From 5 to 10.	From 10 to 15.	From 15 to 20.	From 20 to 30.	From 30 to 40.	From 40 to 50.	From 50 to 60.	From 60 to 70.	From 70 to 80.	From 80 to 90.	From 90 to 100.	From 100 to 110.	From 110 to 120.	Total.
Apoplexy	39	39	4	4	2	3	0	0	0	3	8	15	14	11	10	10	1	1	0	0	78
of the Lungs	1	2	0	1	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	3
Atrophy	14	9	11	6	8	3	3	2	0	1	0	1	1	1	0	3	0	0	0	0	23
Abscess	11	8	6	2	4	1	1	1	0	1	3	4	2	2	0	0	0	0	0	0	19
in the Brain	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Liver	2	1	0	1	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	3
Lungs	2	2	1	1	0	0	0	2	0	0	0	1	0	0	1	0	0	0	0	0	4
Disease of the Brain	1	2	1	2	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	3
Throat and Chest	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Asthma	4	7	0	0	0	0	0	0	0	0	1	0	1	2	2	4	1	0	0	0	11
Aneurism	3	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	3
Aphthæ	2	4	2	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Angina Pectoris	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Arachnitis	2	2	2	1	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	4
Asphyxia	10	2	4	2	6	0	0	0	0	0	4	1	1	0	0	0	0	0	0	0	12
Bronchitis	50	47	40	30	31	12	19	6	0	2	8	3	5	3	2	4	1	1	0	0	97
Burns	7	14	6	10	3	1	5	5	1	1	1	1	1	0	0	2	0	0	0	0	21
Blows received in Fighting	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Cancer	8	20	2	2	1	0	1	1	1	0	1	5	8	3	4	2	1	0	0	0	28
Consumption	338	343	58	74	32	16	22	17	10	35	183	151	111	47	32	20	4	1	0	0	681
Convulsions	175	167	160	147	196	52	41	11	7	0	10	13	7	2	1	1	1	0	0	0	342
Catarrh	29	22	26	21	25	10	7	4	1	0	0	0	1	1	0	1	1	0	0	0	51
Childbed	0	5	0	1	0	0	0	0	0	1	1	2	1	0	0	0	0	0	0	0	5
Croup	62	48	60	47	38	25	36	6	2	0	1	0	0	1	1	0	0	0	0	0	110
Casualties	14	6	5	6	0	1	3	3	2	2	3	3	0	3	0	0	0	0	0	0	20
Colic	7	6	5	3	6	1	0	0	0	1	2	0	1	1	1	0	0	0	0	0	13
Constipation	2	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	3
Caries	2	1	1	1	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	3
Chicken Pox	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Concussion of the Brain	2	1	1	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	3

(Table Continued.)

DISEASES.	Males.	Females.	Boys.	Girls.	Under 1 year.	From 1 to 2.	From 2 to 5.	From 5 to 10.	From 10 to 15.	From 15 to 20.	From 20 to 30.	From 30 to 40.	From 40 to 50.	From 50 to 60.	From 60 to 70.	From 70 to 80.	From 80 to 90.	From 90 to 100.	From 100 to 110.	From 110 to 120.	Total.
Congestion of the Brain	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Lungs	5	1	1	1	0	2	0	0	0	0	2	0	0	0	2	0	0	0	0	0	6
Cramp in the Stomach	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2
Cachexy	0	3	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	3
Cephalalgia	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Cerebral Irritation	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Cholera Morbus	46	27	13	3	0	2	5	7	1	1	14	15	9	9	5	5	0	0	0	0	73
Do. Malignant	563	385	74	50	4	5	33	39	20	23	185	237	168	103	75	48	6	1	1	0	948
Do. Infantum	201	165	201	165	228	106	28	2	2	0	0	0	0	0	0	0	0	0	0	0	366
Coup de Soleil	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Chorea Sancti Viti	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Debility	138	121	95	70	136	11	12	4	1	1	6	8	8	18	22	18	11	3	0	0	259
Diarrhœa	96	76	60	53	49	33	21	8	1	1	13	11	9	9	8	7	2	0	0	0	172
Dropsy	53	62	19	19	5	5	11	11	4	2	11	17	17	15	7	5	4	1	0	0	115
in the Head	109	78	102	78	58	56	43	20	2	1	3	3	0	1	0	0	0	0	0	0	187
Breast	33	29	10	12	4	2	8	3	2	3	5	8	7	8	5	4	3	0	0	0	62
Spine	2	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Dyspepsia	3	4	0	1	0	1	0	0	0	0	0	0	2	3	0	0	1	0	0	0	7
Disease of the Spine	2	2	1	2	0	0	1	1	0	1	0	0	1	0	0	0	0	0	0	0	4
Heart	11	7	5	4	2	2	2	0	2	1	1	2	0	1	3	1	1	0	0	0	18
Hip Joint	1	2	1	2	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	3
Liver	2	3	1	2	2	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	5
Head	5	1	5	1	4	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	6
Chest	1	1	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	2
Bladder	2	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
Stomach	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Bowels	2	1	1	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	3
Womb	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Dysentery	47	31	25	14	8	11	9	8	1	2	4	11	5	4	9	4	2	0	0	0	78
Drowned	52	3	8	2	0	1	1	2	4	2	10	21	6	7	1	0	0	0	0	0	55
Decay	2	2	0	0	0	0	0	0	0	0	0	1	0	0	1	2	0	0	0	0	4

Diabetes	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Drinking Cold Water	2	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	2
Epilepsy	2	5	1	2	2	0	1	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	7
Erysipelas	6	15	2	8	8	1	1	0	0	0	1	4	1	3	2	0	0	0	0	0	0	0	21
Effusion on Lungs and Brain	4	0	3	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4
Enlargement of the Heart	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Spleen	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Empyema	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Eruptions	4	2	4	2	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Fever	46	35	23	16	10	6	11	7	2	3	16	7	7	5	4	2	1	0	0	0	0	0	81
Scarlet	154	153	150	147	22	53	144	68	9	1	3	4	0	3	0	0	0	0	0	0	0	0	307
Hectic	7	3	4	1	0	0	0	3	1	1	3	1	1	0	0	0	0	0	0	0	0	0	10
Typhus	110	86	10	15	3	1	4	6	4	7	52	44	32	22	17	2	2	0	0	0	0	0	196
Intermittent	9	6	8	4	4	2	4	1	1	0	0	0	1	0	1	0	1	0	0	0	0	0	15
Remittent	27	28	8	17	3	2	8	4	3	5	7	7	6	3	4	0	3	0	0	0	0	0	55
Bilious	28	11	8	4	3	2	3	0	3	1	12	10	2	2	0	1	0	0	0	0	0	0	39
Puerperal	0	8	0	0	0	0	0	0	0	0	3	2	3	0	0	0	0	0	0	0	0	0	8
Catarrhal	23	16	21	15	21	8	4	1	1	1	0	1	1	0	0	0	0	1	0	0	0	0	39
Spotted	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Nervous	9	5	3	0	0	0	0	2	1	0	4	4	1	1	1	0	0	0	0	0	0	0	14
Brain	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Continued	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
Found Dead	14	11	6	5	9	1	1	0	0	0	0	6	7	0	0	1	0	0	0	0	0	0	25
Fistula	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Fungus Hæmatodes	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Fracture	3	1	0	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	0	0	0	0	4
Gout	1	2	0	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	3
Gravel	3	0	1	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	3
Gun-shot Wound	2	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
Hernia	2	5	0	0	0	0	0	0	0	0	0	1	1	1	2	2	0	0	0	0	0	0	7
Hæmorrhage	16	14	4	5	4	0	2	1	0	2	7	9	1	2	2	0	0	0	0	0	0	0	30
Hysterics	0	2	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
Inflammation	2	3	0	3	0	1	0	1	1	0	1	0	0	0	1	0	0	0	0	0	0	0	5
of the Lungs	124	101	77	54	43	43	29	7	5	4	19	20	19	15	9	10	2	0	0	0	0	0	225
Breast	10	9	6	6	5	3	3	1	0	0	4	0	0	2	0	1	0	0	0	0	0	0	19
Bowels	73	52	47	22	32	9	11	7	4	6	19	9	12	6	6	1	2	1	0	0	0	0	125
Brain	57	45	34	24	17	9	11	12	4	5	21	11	6	2	1	1	2	0	0	0	0	0	102

(Table Continued.)

DISEASES.	Males.	Females.	Boys.	Girls.	Under 1 year.	From 1 to 2.	From 2 to 5.	From 5 to 10.	From 10 to 15.	From 15 to 20.	From 20 to 30.	From 30 to 40.	From 40 to 50.	From 50 to 60.	From 60 to 70.	From 70 to 80.	From 80 to 90.	From 90 to 100.	From 100 to 110.	From 110 to 120.	Total.
Inflammation of the Stomach	19	22	7	10	3	3	8	2	1	0	7	5	3	4	4	1	0	0	0	0	41
Liver	14	7	1	3	2	0	0	1	0	1	4	3	3	5	1	1	0	0	0	0	21
Heart	4	0	3	0	2	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	4
Kidneys	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Bladder	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
of a Vein	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
of the Throat	24	17	22	17	6	11	15	6	0	1	0	0	1	0	0	1	0	0	0	0	41
Womb	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
Influenza	21	20	10	14	12	7	3	1	1	0	0	5	3	0	4	2	2	1	0	0	41
Insanity	3	5	0	0	0	0	0	0	0	0	1	3	2	1	1	0	0	0	0	0	8
Intemperance	4	1	0	0	0	0	0	0	0	0	3	1	1	0	0	0	0	0	0	0	5
Introsusception	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Irritation of the Heart	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Intestines	1	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Inanition	2	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
Injury of the Spine	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Inebriety	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Jaundice	3	3	2	0	1	0	1	0	0	0	1	0	1	0	1	1	0	0	0	0	6
Laudanum to excess	4	8	1	3	3	0	0	0	0	1	3	4	1	0	0	0	0	0	0	0	12
Locked jaw	3	0	1	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	3
Mortification	12	10	5	5	1	2	5	2	0	0	1	4	3	0	1	1	1	1	0	0	22
Mania	2	4	0	0	0	0	0	0	0	0	1	1	4	0	0	0	0	0	0	0	6
a Potu	124	26	0	1	0	0	0	0	0	1	43	46	41	13	4	2	0	0	0	0	150
Measles	62	56	62	56	22	45	37	12	1	1	0	0	0	0	0	0	0	0	0	0	118
Malformation	5	1	5	1	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Mumps	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Marasmus	28	30	26	27	19	21	10	0	1	2	2	1	1	0	1	0	0	0	0	0	58
Nervous affection	0	2	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
Old age	32	60	0	0	0	0	0	0	0	0	0	0	0	0	2	26	47	11	5	1	92
Obstruction of the Liver	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1

Ossification of the semilunar valves of the aorta	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Pleurisy	14	5	0	0	0	0	0	0	0	0	2	6	7	1	1	2	0	0	0	0	19
Palsy	20	27	2	4	2	0	0	1	1	2	4	2	4	8	7	11	3	2	0	0	47
Perished of cold	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Poison	0	3	0	2	0	0	3	0	0	1	1	0	0	0	0	0	0	0	0	0	3
Quinsey	4	3	4	3	2	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Rheumatism	1	4	0	1	0	0	1	0	0	0	2	1	0	0	0	1	0	0	0	0	5
Rupture of Blood Vessel	2	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2
Small-Pox	21	16	8	5	4	3	3	2	1	0	18	5	1	0	0	0	0	0	0	0	37
Still-Born	155	119	155	119	274	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	274
Sudden	26	26	10	13	13	1	4	3	1	1	2	14	6	2	2	3	0	0	0	0	52
Scrofula	15	10	10	9	6	2	4	3	2	2	1	1	2	1	1	0	0	0	0	0	25
Spasms	6	0	6	0	4	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	6
Scirrhus	1	3	0	1	0	0	1	0	0	0	1	0	1	1	0	0	0	0	0	0	4
Suicide	3	2	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	5
Syphilis	3	5	1	1	0	0	1	0	0	1	3	3	0	0	0	0	0	0	0	0	8
Sulphate Morphia to excess	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Scalding	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Scurvy	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Teething	11	3	11	3	7	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	14
Unknown	82	50	32	29	33	13	10	3	1	1	14	29	13	8	4	2	1	0	0	0	132
Ulcers	4	7	1	7	1	4	2	0	0	1	0	0	2	1	0	0	0	0	0	0	11
Violence	1	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2
Varioloid	3	3	2	3	3	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	6
Vomiting	2	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
Whooping-Cough	26	32	26	32	30	12	11	4	1	0	0	0	0	0	0	0	0	0	0	0	58
Worms	6	6	6	6	0	1	7	4	0	0	0	0	0	0	0	0	0	0	0	0	12
White-swelling	2	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2
Wounds	4	0	1	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	4
	3706	2993	1871	1578	1521	643	689	336	118	142	791	836	599	375	285	218	111	28	6	1	6699

Of the above there were Males of 20 years and upwards, 1,835; under 20 years, 1,871; 1,415 Females of 20 years and upwards, and 1,578 under 20 years.

There were 590 returns received at the Health Office, of persons who died in the Alms-house, in the City, and 45 in the Alms-house at Blockley, during the year; 706 people of colour are included in the total number of deaths.

Agreeable to returns made at the Health Office, and collected from 162 Practitioners of Midwifery, there have been born in the City and Liberties, from the 1st of January, 1832, to the 1st of January, 1833, 3,834 male, and 3,419 female children; making the total number of births 7,253, leaving a difference between the births and deaths of 554.

Deaths in each Month of the above period.

	Adults.	Children.	Total.
January	253	361	614
February	151	324	475
March	218	298	516
April	215	257	472
May	274	299	573
June	179	211	390
July	200	365	565
August	1099	590	1689
September	215	234	449
October	194	192	386
November	130	127	257
December	136	177	313
	3264	3435	6699

By order of the Board of Health,

WM. A. MARTIN, *Clerk.*

Health Office, Philadelphia, Jan. 1, 1833.

Remarks on the above by G. EMERSON, M. D.—The bill of mortality for the year 1832 will be found to differ considerably from those of former years. In the first place it has been improved in form, by the addition of four new columns, designating for each disease which has proved the source of mortality, the respective amount of males and females, with the numbers under and beyond the age of puberty. This alteration is a valuable desideratum, since with the former arrangement, in which the distinction was made in the whole mortality, it was impossible for one who had not access to the original register, to ascertain the particular proportion of the sexes and ages dying of any one disease. The investigator of medical statistics will be saved much time and trouble by these new designations.

The most important difference is, however, in the increase of the general mortality, which exceeds that of the preceding year, (1831,) to the amount of 1760. The largest proportion of this excess is to be attributed to the visitation of malignant cholera. The precise amount of the deaths, specified as from this disease, is 948. Of this number it appears that 563 were males, and 385 females, and that only 74 males and 50 females were under the age of 21; leaving the excess of adults 824, out of the total number of 948.

We have on a former occasion stated the population, included within the limits of the Philadelphia bill of mortality, at the late census in 1830, to be 167,811. Supposing the increase since at the rate of 3½ per cent. per annum, the amount in 1832 would be 188,367, which would make the proportional mortality for the year from all sources, about 1 in 29.3 inhabitants. Deducting the deaths from malignant cholera, the annual proportional mortality would be 1 in 34.3. The proportion from malignant cholera alone is about 1 to every 200 inhabitants. In these computations the still-born are excluded, and no distinction made as to colour.

When, however, the mortality of the blacks is separately considered, we find the proportion about 1 in 21.8 of their population. In the preceding year it was only 1 in 31.7, an unusual small proportion for this class.

By taking the mortality reported from the forms of bowel complaints, ordinarily designated under the heads cholera morbus, diarrhœa, and dysentery, the account of 1832 would stand thus compared with that of 1831.

1831.		1832.	
Cholera morbus and Infantum	320	Cholera morbus	73
Diarrhœa	81	Cholera infantum	366
Dysentery	121	Diarrhœa	172
		Dysentery	78
Total	522	Total	689
		Total in 1831	522
		Excess in 1832	167

The amount thus reported in 1832, under the ordinary heads of bowel complaints, compared with the whole mortality, (that from malignant cholera excepted,) is about 1 in 8, being nearly the same as usual, and even less than it has been in some years, as for instance in 1823, during the prevalence of the febrile epidemic, when the proportional mortality from bowel affections was 1 in 7.7 of the general mortality.

This is a strong evidence of the accuracy with which the ordinary bowel complaints were designated from the malignant form. Another evidence, we think, is furnished by the fact that only a small proportion of the deaths reported under the ordinary heads, of bowel affections occurred in adults, among whom malignant cholera was so particularly prevalent. The periods of life most subject to malignant cholera offers a most interesting subject for medical inquiry.

As the excess of mortality over that of the previous year is 1760, and the amount from malignant cholera only 948, it is evident that the other sources of mortality must have been increased. Accordingly, we find that of the 812 left after deducting from the total excess the mortality from malignant cholera, 719 were reported under the following heads in the given proportions, viz.—Apoplexy, 18; Bronchitis, 34; Consumption, 8; Convulsions, 65; Fevers, 177; Scarlet fever, 107; Inflammations, 143; Measles, 95; Unknown, 72.—Total, 719.

It is worthy of remark that the increase of febrile mortality is chiefly comprised under the head of typhus, the rest being generally below the number reported in the preceding year. The interments under the head of typhus fever have been increasing for the last three years. In 1830 they were about 1 in 77 of the whole mortality; in 1831 about 1 in 15, whilst in 1832 they amounted to about 1 in 28 of the general mortality.

As we view scarlatina and puerperal fevers as distinct from the ordinary forms of fever, we have not included them under the same head. It will be seen that scarlet fever has been unusually fatal during the year just past. The proportional mortality from scarlet fever has been increasing for several years past. Thus, in 1830, it amounted to about one per cent. of the whole mortality, whilst in 1831 it was 1 in 23, and during the past year, (1832,) amounted to about 1 in 18 of the mortality from all diseases.

There has been a striking increase in the mortality of measles during the same time.

The greatest mortality from the phlegmasia is recorded under the heads of inflammations of the lungs, breast, pleurisy, and bronchitis, all of which being situated in the same cavity, we have thrown together so as to exhibit the whole amount with the respective proportions reported of each, as compared with the same for the preceding year, viz.—

	1831.	1832.
Inflammation of the lungs -	192	225
Do. of the breast -	28	19
Pleurisy - - - - - -	24	19
Bronchitis - - - - -	63	97
	307	360

From the very prevalent opinion, that during the existence of an epidemic all other diseases assume its type and fall into its train, it might be suspected that the excess of mortality from other diseases than malignant cholera, had chiefly occurred during the months previous to, and following its visitation. But an examination of the monthly mortality proves the reverse; namely, that during the months of July and August, in which malignant cholera prevailed, the mortality from other diseases was greatly increased beyond what it had been in the same months of the preceding year. Neither can this excess be mainly ascribed to other forms of bowel complaints, since much of it was owing to deaths from consumption, fevers, and inflammations.

The first case of malignant cholera was reported to the Board of Health on the 11th of July, the individual having been taken on the 5th, and died on the 8th. From this time to the 27th of the same month, only 6 or 7 cases were reported, on different days, but from the 27th the daily reports were uninterrupted till about the 8th of September. Of the whole mortality from malignant cholera, namely, 948, 852 took place between the 27th of July and 25th of August. The reports for each week the epidemic prevailed, were as follows, viz.—

		Adults.	Children.	Total.
2d week in July, ending the	14th, malignant cholera	1	0	11
3d - - - - - -	21st - - -	3	0	3
4th - - - - - -	28th - - -	8	0	8
1st week in August, ending the	4th - - -	81	3	84
2d - - - - - -	11th - - -	335	35	370
3d - - - - - -	18th - - -	238	44	282
4th - - - - - -	25th - - -	67	49	116
5th - - - September	1st - - -	41	4	45
1st week in September, ending the	8th - - -	13	5	18
2d - - - - - -	15th - - -	8	0	8
3d - - - - - -	22d - - -	6	0	6
4th - - - - - -	29th - - -	4	0	4
1st week in October, ending the	6th - - -	2	1	3
Totals - - - - - - - - - -		807	141	948

The number of births reported falls short of that for 1831 by 89. The excess of male births is greater than usual, and amounts to no less than 415. We think that the visitation of the late epidemic has led to some omissions in the returns appertaining to this department, since it is not likely that it could have interfered with the conceptions which must have taken place so long before its approach was apprehended. Never since the births have been registered in Philadelphia has their amount been so nearly encroached upon by that of the deaths, as to leave the balance only 554 in their favour. Last year, (1831,) the difference between the births and interments, was 2,403.

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Notice of a Malignant Disease generated on Ship-board by Filth, Imperfect Ventilation, &c. By JOHN H. GRISCOM, M. D. [Communicated in a letter to J. K. Mitchell, M. D.]—In accordance with my promise made to you when we last met, I have taken some pains to inquire into the circumstances attending the awful mortality which prevailed on board the ship Sybilla, Captain Thornhill, during her passage from Holland to this port. The unparalleled destruc-

tion of human life in that vessel, was not, I am satisfied, caused by the scourge which has within the last few years devastated so many countries, but was a disease generated among these unfortunate wretches by their horribly filthy condition, and their total want of attention to their persons. From all that I can learn from the captain and consignees, there did not appear to be any positive symptoms of cholera, except intense *thirst*, and to allay this, they were continually calling for gin. Neither *cramps*, *vomiting*, nor *diarrhœa* attended these cases, nor indeed did there seem, from the accounts of these gentlemen, to be any febrile excitement, but in some cases, the captain states, they would be seen to shake, as with a rigor of intermittent, which would soon pass off, and leave them as before. The disgusting condition in which they kept themselves, swarming with vermin *cap à pie;* lying all day in their births without attempting to go on deck during the whole voyage; three or four huddling themselves together in a place destined to accommodate only one or two; totally inattentive to their own situation, and to the victims who were daily falling around them, whether kindred or not; this condition of things, I say, existed nearly two months prior to their being received on board the vessel. The passengers were from Wirtemberg, and for sixty days had been living in the canal boats which brought them down, not being allowed to leave the canal side, and were consequently obliged to drink the canal water, in which copper-bottomed vessels were floating, which is supposed to have been one powerful cause of the miserable diathesis to which they were reduced.

Considerable mortality had happened among them before embarkation, and the first death on board, occurred the day after their departure from the Helvoetsluys. Their food during the voyage consisted of peas, beans, potatoes and other fresh vegetables, fresh and salt meats, &c. all good and in abundance; they however ate but little, but all their desire was for gin and sugar, in which they would soak their bread, giving it even to their children of two years old. So perfectly listless and inattentive were they to their own situation, and so much a matter of indifference was it to them to be living or dying, that it was found necessary to make it the duty of the crew to go down every morning into the steerage, and after first searching out the corpses, and consigning them to their watery grave, to turn their attention to cleansing the living; to do which they were obliged to lift even the females from their beds of filth, and endeavour to relieve their bodies from some of the dirt with which they were covered, though without the least assistance from the poor wretches themselves. The whole number of them was one hundred and thirty-two, (seventy-four of them children,) of whom ninety-four perished during the voyage.

If there was any disease with which they were affected, and to which a name could be given, typhus would probably be the most appropriate. The officers and crew, who were fortunately not only willing, but indefatigable in their endeavours to keep these people in the best condition possible, spending two or three hours every morning among them, and this too during a protracted and stormy passage of ninety days, were in excellent health during the whole time.

On the Peruvian Bark as a Counter-agent to the Poisonous Effects of Arsenic. By Elias J. Marsh, M. D. [In a note to the Editor.]—Sir, The November No. of your Journal contains a communication from Dr. Perrine, detailing the effects produced on himself by swallowing accidently a large dose of arsenic.

How far the action of the poison may have been checked by the Peruvian bark, with which it was taken, is worthy of inquiry; and the object of this note is to communicate a statement just recalled to my memory, made several years ago by Professor J. A. Smith, of New York, to his class. Professor S. stated that a medical friend had related to him several cases of poisoning by arsenic, which he had successfully treated by administering large doses of Peruvian bark and milk.

Paterson, N. J. January, 1832.

Dr. Mott's case of Ligature of external Iliac Artery.—Dr. Vaché in a letter we have recently received from him, informs us that the patient in whom Dr. Mott tied the external iliac for the cure of diffused femoral aneurism, and an account of which was published in our 8th Volume, has done well and enjoys perfect health.

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Transylvania University.—The number of students in the medical department of this University during the past session was 226. The number graduated at the commencement in April last, 69.

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University of Pennsylvania.—The number of students in this institution during the session 1832–3 was 823; of which 368 were medical students.

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Dunglison's New Dictionary of Medical Science and Literature.—We are happy to announce the appearance of this work. It comprises a copious vocabulary of technical terms, with their derivations, definitions, and French and German synonymes—biographical notices of the principal medical writers—and a list of the best works and authors on each subject. An index is given to the synonymes, by which it has the advantage of being a French and German, as well as an English Dictionary. To execute such a work requires great erudition, unwearied industry, and extensive research, and we know no one who could bring to the task higher qualifications of this description than Professor Dunglison.

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Professor Ducatel's Introductory Lecture.—The subject of this lecture is the prejudice which we feel mortified to confess still prevails in the minds of some persons, that chemistry is merely an *ornamental* branch of the medical profession, an opinion which the professor has ably refuted. The lecture is creditable to its erudite author, and the school in which he holds a chair.

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Haxhall's Prize Essay on Fistula Lachrymalis.—The Boylston prize was last year awarded to Robert W. Haxhall, M. D. of Richmond, Virginia, for his Essay on Fistula Lachrymalis. This essay, though it cannot lay any high claims to depth of research, or originality of views, displays considerable ingenuity, and is creditable to its author.